# Requienella seminuda, a corticolous ascomycete on Fraxinus excelsior new to Norway

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### KEYWORDS

Bark-living fungi, ash, temperate deciduous forest, broadleaved forest

NØKKELORD Barklevende sopp, ask, edellauvskog

### SAMMENDRAG

Den pyrenomyket-lignende sekksporesoppen *Requienella seminuda* (Eurotiomycetes, Pyrenulales, Requienellaceae) presenteres. Arten er kjent fra Europa og Nord-Amerika, men er ny for Norge och Sverige. Den ble først funnet på Grinde, Leikanger i Sogn og Fjordane i 2011, og i løpet av 2012-2013 fant vi den på 15 nye lokaliteter i Sør-Norge fra Akershus til Sogn og Fjordane. Alle funnene var på bark av gamle, levende asketrær, og den synes ofte å være assosiert med sjeldne eller rødlistede lav.

### SUMMARY

The pyrenomycetous ascomycete *Requienella seminuda* (Eurotiomycetes, Pyrenulales, Requienellaceae) is presented. The species is known from Europe and North America but was not previously reported from Norway and Sweden. The first find in Norway was made in Grinde, Leikanger, Sogn og Fjordane in 2011 and during 2012-2013 we found 15 additional localities in different parts of southern Norway from Akershus to Sogn og Fjordane. It was growing on bark of old living *Fraxinus* trees, often in association with rare or red-listed lichenized fungi.

### **INTRODUCTION**

Many species of non-lichenized ascomycetes occur on the bark of living trees as saprobes or weak parasites. In general, the communities of such species are not well known, as they tend to be neglected by most mycologists. We here present a species which is widespread on trunks of ancient *Fraxinus excelsior* (Oleaceae), but has previously not been reported from Scandinavia, *Requienella seminuda* (Pers.: Fr.) Boise. *Requienella seminuda* belongs to the family Requienellaceae in the Pyrenulales, Eurotiomycetes (Lumbsch and Huhndorf 2009).

## MATERIALS AND METHODS

Collections of *Requienella seminuda* were attained during various field surveys in temperate deciduous forest and woodlands, both in Norway and Sweden. Only the Norwegian finds are treated in detail here. Positions were taken in UTM (WGS84, zone 32) with handheld GPS with an accuracy of +/- 10 m. The collections were studied using Nikon dissecting and light microscopes, and the description is based on the Norwegian



Figure 1. *Requienella seminuda* on bark of *Fraxinus excelsior* from the localities Hordaland: Os: Lio. (A-B) and Sogn og Fjordane: Leikanger: Grinde (C-E). A. Immature ascomata. B. Mature ascomata. C. Asci. D. Ascus tops in Kongo red. Two developmental stages are illustrated, the two ascus tops on the left being younger than the one on the right. E. Ascospores. C and E were photographed using phase contrast. See text for measurements. Photo B. Nordén.

material. Microscopic slides were mounted in water unless otherwise stated. Photographs were taken with Nikon digital cameras. The names of the collectors are abbreviated as BN (Björn Nordén), HB (Harald Bratli) and JBJ (Jon Bjarne Jordal). The specimens will be deposited in herbarium O (Norwegian collections) and in GU (Swedish collections).

### Description

Ascomata 0.5-1 mm in diameter, subglobose, with a broad-based pointed papilla with a central ostiole, dispersed/scattered or clustered a few together, black; immersed at first, growing just below the bark surface, appear like a black spot surrounded by a white ring (Fig. 1A), later they break through the bark and finally become visible with half the ascocarps/fruit bodies ranging above the bark surface (Fig. 1B). Asci 143–163 × 14–19 µm, cylindrical to narrowly fusoid (Fig. 1C), with a complex apical apparatus (Fig. 1D). Pseudoparaphyses 2-3 µm wide, unbranched and septate. Ascospores 4-8 per ascus, obliquely uniseriate,  $25-35 \times 9-12 \mu m$ , ellipsoid, 3-5-distoseptate with lenticular, spherical or rhombical lumina, brown (Fig. 1E).

### Habitat, substrate and distribution

We first discovered the species in Norway during field investigations in Grinde, Leikanger municipality, Sogn og Fjordane County in 2011. Subsequently it was found to be widespread in forests and woodlands with old *Fraxinus* trees.

*Requinella seminuda* was growing on rough bark of old, living *Fraxinus* trees, both pollarded and unpollarded, in several different habitats (Fig. 2, Table 1). The circumference of the host trees ranged between 120-390 cm 1.3 m above the ground (n=48 trees). The species was found up to at least 2-2.5 m above the ground. Other corticolous, non-lichenized pyrenomycetous ascomycetes on the trees were for instance *Kirschsteiniothelia aethiops* 



Figure 2. Habitat of *Requienella seminuda*, living bark of an old *Fraxinus excelsior* in Hordaland: Etne: Frettestranda. Photo J.B. Jordal.

(Berk. & M.A. Curtis) D. Hawksw., *Lophiostoma myriocarpum* Fuckel and *Navicella pileata* (Tode: Fr.) Fabre. The trees typically had a rich flora of other saprophytic and lichenized fungi, some of which are red-listed in Norway.

We found *Requinella seminuda* at 16 sites from Akershus in southeastern Norway, north to Sogn og Fjordane in western Norway. The sites were 3-370 m above sea level and belong mainly to the boreonemoral to southern boreal vegetation zones (Moen 1999), in a few cases bordering the middle boreal zone. The climate varies from weekly to strongly oceanic (sections OC to O3t according to Moen 1999). 75% of the trees were growing on hillsides facing against south or west. The distribution seems to indicate a southern species, but may also be limited by the distribution of *Fraxinus* trees, which become much rarer north of Sogn og Fjordane. Table 1. Norwegian localities of *Requienella seminuda*. In localities with more than one tree, positions are given as ranges. Abbreviations: UTME=east-coordinate, UTMN=north-coordinate.

County	Municipality	Locality	Habitat	Date	UTME	UTMN	Leg
Akershus	Bærum	Bjørum northeast	seminatural grassland, on bark of four pollarded <i>Fraxinus excelsior</i>	21.09. 2012	580750- 580799	6644955- 6645143	BN
Akershus	Bærum	Tanumbråten north	tall herb broadleaved forest, on bark of six pollarded Fraxinus excelsior	20.09. 2012	582335- 582381	6640222- 6640318	BN
Hordaland	Bømlo	Spyssøya, Stølsvika south	low herb broadleaved forest, on bark of one unpollarded and one pollarded <i>Fraxinus</i> <i>excelsior</i>	11.05. 2013	295859- 295865	6626480- 6626486	BN, JBJ
Hordaland	Etne	Frettestranda	scree, on bark of two pollarded and one unpollarded <i>Fraxinus</i> excelsior	08.05. 2013	340071- 340296	6623454- 6623506	BN, JBJ
Hordaland	Etne	Lunda	wooded meadow, on three pollarded <i>Fraxinus excelsior</i>	15.05. 2013	339736- 339755	6624684- 6624881	JBJ
Hordaland	Fusa	Femangerlia	scree, on one pollarded Fraxinus excelsior	25.05. 2013	320417	6669372	BN, JBJ
Hordaland	Kvinnherad	Alsåker east	scree, on six unpollarded Fraxinus excelsior	02.10. 2013	335131- 335360	6628780- 6628884	BN, JBJ
Hordaland	Odda	Buer east	tall herb broadleaved forest, on two unpol-larded <i>Fraxinus</i> <i>excelsior</i>	03.10. 2013	359629- 359572	6659165- 6659195	BN, JBJ
Hordaland	Os	Lio	low herb broadleaved forest, on five pollarded <i>Fraxinus</i> <i>excelsior</i>	24.05. 2013	309677- 309761	6682237- 6682369	BN, JBJ
Rogaland	Sauda	below Smelvenuten	low herb broadleaved forest, on bark of one pollarded <i>Fraxinus excelsior</i>	05.10. 2012	354030	6617824	BN, JBJ
Rogaland	Strand	Fiskåneset east	wooded meadow, on bark of one pollarded <i>Fraxinus</i> <i>excelsior</i>	08.10. 2012	328071	6556960	BN, JBJ
Rogaland	Strand	Rag	wooded meadow, on bark of two pollarded <i>Fraxinus</i> <i>excelsior</i>	03.10. 2012	326098- 326116	6555340- 6555365	BN, JBJ
Rogaland	Strand	Vatland	low herb broadleaved forest, on bark of one unpollarded and two pollarded <i>Fraxinus</i> <i>excelsior</i>	08.10. 2012	325722- 325735	6555448- 6555574	BN, JBJ
Rogaland	Tysvær	Pyttane	low herb broadleaved forest, on bark of two unpollarded <i>Fraxinus excelsior</i>	14.05. 2013	319060- 319096	6582091- 6582167	JBJ
Sogn og Fjordane	Leikanger	Grinde, upper	wooded meadow, on one pollarded <i>Fraxinus excelsior</i>	09.09. 2011	378396	6785930	JBJ, HB
Sogn og Fjordane	Leikanger	Eitorn	wooded meadow, on six pollarded <i>Fraxinus excelsior</i>	15.06. 2012	372739- 372930	6788715- 6788829	BN, JBJ

Several collections of the species were earlier made in southern Sweden by the first author, from the provinces Blekinge, Småland, Öland, Bohuslän, Västergötland and Västmanland. The species is new also to Sweden (Eriksson 2014).

#### DISCUSSION

According to Boise (1986) the spores can be 3-7-septate, in our material they were mostly 3-5 septate. R. seminuda may be restricted to Fraxinus in Scandinavia as we have searched for it in vain on hundreds of Ulmus and Quercus trees, and other substrates. However, there are indications that there may be different forms of this species or closely related species in other countries, growing on different substrates (Walter Jaklitsch in litt.). There are reports of the species from bark of living Olea (France), Fraxinus, Nyssa and Quercus (USA; Boise 1986). It is also known from Great Britain with only one record, on Sambucus nigra (British Mycological Society 2014). There exists a variation in the number of septa per ascospore among collections that may warrant genetic investigation, and work on this is underway (Walter Jaklitsch in litt.).

A species with similar spores, *Acrocordiella occulta* (Romell) O. Eriksson, occur on *Ribes*. An old record on *Ribes grossularia* from Sweden was cited by Boise (1986) who together with Barr (1990) considered it a synonym of *R. seminuda*. However, subsequent authors (and Barr in litt., see Hausknecht et al. 2003) have refuted this ((Eriksson and Hawksworth (1986: 115 - Note 4); Harris (1995: 93); Eriksson & Hawksworth (1996: 104 - Note 2026); Hausknecht et al. (2003)).

Eriksson (2014; under Acrocordiella) suggested that Melanomma seminudum (Fuckel) Sacc. (non Sphaeria seminuda Pers.: Fr) recognized by Holm (1957: 59) should be compared to R. seminuda as it might be conspecific. However, Melanomma seminudum (Fuckel) Sacc. has smaller (200-300  $\mu$ m in diameter) crowded ascomata, ellipsoid to cuneiform spores with median constriction and normal spore lumina, that are clearly smaller (11-15 × 4.5-5  $\mu$ m) than in *R. seminuda*, and was found on *Alnus*, *Betula* and *Quercus* in Sweden (Holm 1957).

As *Requinella seminuda* is easily recognized in the field and fairly common on old *Fraxinus* trees in Sweden and Norway, it is somewhat surprising that it was not discovered earlier. If it, as it appears, is restricted to old *Fraxinus* trees, it may be in decline due to the ongoing ash dieback that now occur in most of the distribution of *Fraxinus* in Norway, as are several lichenized fungi on *Fraxinus* in Great Britain (Ellis et al. 2013).

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