

Entoloma gomerense Wölfel & Noordel. – a new species to Northern Europe

Jostein Lorås¹, Øyvind Weholt¹, Siw Elin Eidissen¹
¹Høgskolen i Nesna, NO-8700 Nesna, Norway

Kontakt: josteinl@hinesna.no

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KEYWORDS

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NØKKELOORD

Entoloma gomerense, gammel grankalkskog, Holmvassdalen naturreservat, Norge

SAMMENDRAG

I Norge er *Entoloma gomerense* funnet på fem ulike lokaliteter i Holmvassdalen naturreservat i Nordland i perioden 2008-2013. Denne rødsporen er tidligere kun funnet et fåtall ganger i Sør-Europa, på Kanariøyene og øst i Russland. Beskrivelser av de norske funnene og sammenligninger av artens økologi gis i artikkelen.

ABSTRACT

Entoloma gomerense is found in North-Norway in five different locations in Holmvassdalen Nature Reserve in the period 2008-2013. This *Entoloma* has previously only been found a few times in southern Europe, The Canary Islands, and eastern Russia. Descriptions of the Norwegian finds and comparisons of the species' habitats are presented in the article.

INTRODUCTION

In 2010, an international workshop was held in Grane and Hattfjelldal municipalities in Nordland county, Norway. The aim of the gathering was to find rare and red-listed species, particularly in the genus *Entoloma* (Hanssen 2011). Most of the fieldwork was carried out in Holmvassdalen Nature Reserve in Grane, where a long range of *Entoloma* species already had been found in the period 2007-2009. During the workshop two finds of *E. gomerense* were done, both examined and determined by Machiel Noordeloos during the workshop. Later on, examinations of a large material of *Entoloma* from the same area revealed three additional finds. This time Øyvind Weholt identified the finds and fieldwork had been carried out by Jostein Lorås, Siw Elin Eidissen and Maja Eidissen. This paper presents a short description of the Norwegian finds, information on distribution, and discussion on the species' ecology.

Entoloma gomerense is a species in subgenus *Leptonia* and belongs to the section *Serrulatum*. This section is characterized by more or less blue colours of pileus and stipe and a distinct dark blue lamellae edge. Macroscopically the species is recognized by the dark blue, strongly striate pileus (Fig. 1) that is only partly squamulose and by the blue colour that gradually vanishes and turns more brownish with age. The lamellae have a bluish tint and a distinctly serrulate, blue edge (Fig. 2). The stipe is polished and of the same colour as the pileus. *Entoloma gomerense* is easily distinguished from *E. serrulatum* by the striate pileus. Microscopically it is recognized by clampless basidia and presence of easily observable, more or less pigmented cheilocystida,



Figure 1. *Entoloma gomerense* showing typical black and bluish color of pileus, collected 13.09.2008. Photo: Jostein Lorås.

varying from broadly clavate to cylindrical and lageniform.

Spores are described for the holotypus as 9.0-10.5 (-11.5) x 6.5-9.0 μm , Q = 1.2-1.4 and 5-6 angled in side view (Wölfel and Noordeloos 2001). Spore measurements of three collections are:

- a) 9.5-11 x 7.8-8.4 μm , Q = 1.25-1.49 μm
- b) 9.0-11.1 x 7.0-8.6 μm , Q = 1.25-1.55 μm
- c) 9.5-11.3 x 7.0-8.5 μm , Q = 1.19-1.38 μm

Spores and cheilocystidia from the three collects are depicted in Fig. 3, showing also the variation in the shape of the cheilocystidia.

Material studied

Norway: **Nordland:** Grane: Holmvassdalen, a) UTM (WGS84) zone 33W 7245275, 421258, 13.09.2008, leg. Maja Eidissen, det. Ø. Weholt; b) UTM (WGS84) zone 33W 7245154, 421150, 31.08.2010, leg. & det. Machiel E. Noordeloos; c) UTM (WGS84) zone 33W 7244745, 421013, 02.09.2010, leg. S. E. Eidissen, det. Machiel E. Noordeloos; d) UTM (WGS84) zone 33W 7244809, 421065, 05.09.2011, leg. J. Lorås



Figure 2. Lamellae of *E. gomerense* showing the serrulate, more or less blue edge of lamellae, collected 05.09.2011. Photo: J. Lorås.

and S.E. Eidissen, det. Ø. Weholt; e) UTM (WGS84) zone 33W 7245238, 421231, 04.09.2013, leg. J. Lorås and S. E. Eidissen, det. Ø. Weholt.

Description of the localities

- a) Found among decayed trunks in a meadow of tall-herbs on calcareous soil in old spruce forest (*Picea abies*). This find was examined in 2011.
- b) 31.8.2010: Found during the *Entoloma*-workshop, on calcareous ground in herb meadow in old *Picea*-forest (Noordeloos 2012: 521).
- c) 2.9.2010: Found during the *Entoloma*-workshop, on calcareous ground in old *Picea*-forest in tall-herb flushes (Norwegian Mycological Database).
- d) 5.9.2011: Found in moss in a tall-herb meadow, dominated by *Filipendula ulmaria* and *Aconitum lycoctonum* ssp. *septentrionale*, close to flushes in old calcareous spruce forest.
- e) 4.9.2013: Found in a transition site between a tall-herb meadow and an old spruce forest on calcareous, nutrition poor soil.

The finds from Holmvassdalen Nature Reserve have several environmental factors in common, like old spruce forest, calcareous soil and tall-herb habitats with bryophytes in the ground

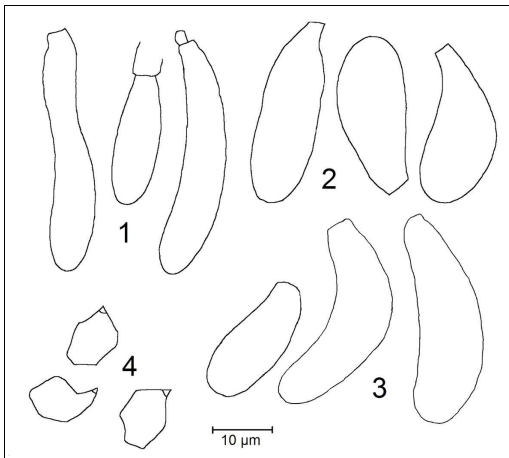


Figure 3. *Entoloma gomerense*. 1. Cystidia 13.09.2008 (a). 2. Cystidia 05.09.2011 (d). 3. Cystidia 04.09.2013 (e). 4. Spores 04.09.2013 (e).

layer. The humidity of the air in these sites is rather high, since they are situated along the river in Holmvassdalen, partly flowing in the bottom of a canyon-like valley (Fig. 4). The

tall-herb meadows form minor circumscribed areas with a whole range of rare fungi: *Entolomas* like *E. alvarens* Noordel. & Vauras, *E. callirhodon* Hauskn. & Noordel., *E. fulvoviolaceum* Noordel. & Vauras, *E. viiduense* Noordel. & Liiv and *E. sublaevisporum* Vila, Noordel. & O.V. Morozova, and also one new previously undescribed species provisionally named *E. holmvassdalensis* (Weholt et al. in prep.). Additionally, the following groups or genera abound at these locations: club fungi, earth tongues and wax caps, thus representing a community of fungi forming a mycosynusium (Nitare 2000).

DISCUSSION

According to Noordeloos, *E. gomerense* generally prefers moist places with mosses and peaty soil (Noordeloos 2012). It was originally described from a few localities on the island La Gomera, of the Canary Islands, found in roadside in evergreen Laurel forest,



Figure 4. The river in Holmvassdalen flows partly in a canyonlike valley, keeping moisture in the air constantly high. Photo: J. Lorås.

between leaves and moss (Wölfel and Noordeloos 2001, Noordeloos 2004). Occurrence in roadside implies that the habitat is a result of human impact, but still large areas of evergreen forest on the island are largely natural than cultural (Nogue et al. 2013). Other findings in Europe are very few, but one from Catalonia, Spain in 1996 was recorded on decayed wood in humid deciduous wood of *Laurus nobilis* and *Osmunda regalis* (Vila 2005). In Russia: Primorsky Territory, Kedrovaya Pad Nature-reserve, *E. gomerense* was found on soil and decayed wood in a flood plain forest (Noordeloos and Morozova 2010).

The habitats in Holmvassdalen seem to differ at key points from those of the other areas (Noordeloos 2004). Firstly, Laurel forest is subtropical, with high humidity and rather constant, mild temperatures thus very unlike

the environment in Holmvassdalen, which has seasonal climatic variations as a marked feature. In this area long winters with much snow and short summers are characteristic. It seems that this condition could significantly compensate for the constant high humidity at the localities on La Gomera. This also applies to finds in the flood plain forest in Russia Primorsky Territory and Catalonia, both having a much more humid and milder climate than in Holmvassdalen.

Secondly, the species of trees and vegetation are a very diverge factor. Deciduous forest dominates all described habitats except those of Holmvassdalen, where old spruce forest is typical, mixed with a few birches. The vegetation of vascular plants on the locations is not described for finds outside Holmvassdalen. In this area the habitats of *E. gomerense* are



Figure 5. Habitat for *E. gomerense* with *Aconitum lycoctonum* ssp. *septentrionale*, in old calcerous spruce forest. The fern *Athyrium filix-femina* is displacing *Aconitum lycoctonum* ssp. *septentrionale*, which now is about to be decimated due to trampling. Photo: J. Lorås.

characterized by dominance of the tall-herb *Aconitum lycoctonum* ssp. *septentrionale*. This tall-herb seems to have an important ecological function, as it has large leaves protecting against dehydration (Lorås and Eidissen 2011).

Thirdly, it is remarkable that the other finds have no references to calcareous soil, which must be regarded as essential to the habitats in Holmvassdalen. Probably *E. gomerense* in boreal spruce forests is rather calciphilous, confined to limestone habitats. We assume that habitats of the same type as in Holmvassdalen are typical for the species at its northern border. However, to obtain more secure conclusions about habitat ecology further recordings and more precise descriptions of vegetation, humidity etc. in the close vicinity of the finds are necessary.

Threats

Entoloma gomerense undoubtedly seems to be depended of calcareous habitats in its boreal locations. This type of habitat, moist spruce forest on calcareous ground, is threatened by modern forestry and other ecological changes, resulting in a less moist and less stable microclimate (Brandrud et al. 2010). Unfortunately, *Aconitum lycoctonum* ssp. *septentrionale* is vulnerable to trampling, because of a fragile tall stalk (Arnesen and Lyngstad 2012). As a result especially the fern *Athyrium filix-femina* is displacing *Aconitum lycoctonum* ssp. *septentrionale*, which is about to be decimated in Holmvassdalen Nature Reserve (Fig. 5). Loss of species richness may then take place. Therefore further mapping and monitoring of rare species should be made to implement effective management.

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