

# Transhumance and Biodiversity in European Mountains

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Edited by  
**R.G.H. Bunce, M. Pérez-Soba**  
**R.H.G. Jongman, A. Gómez Sal**  
**F. Herzog and I. Austad**

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## Diversity of macrofungi in seminatural grasslands of the subalpine summerfarm landscape around Dovre, Southern Norway

J.B. Jordal

N-6610 Øksendal, Norway  
e.mail: [bjjordal@online.no](mailto:bjjordal@online.no)

### Introduction

This study is a synthesis of different projects made for management purposes in summer farm areas and grazed pastures in subalpine and low alpine areas (e.g. Jordal 2000, Jordal & Gaarder 1999). The study is dealing principally with grassland fungi, i.e. fungi occurring mainly in grasslands, without regard to type of grassland. Special attention is paid to the pasture fungi, i.e. specialized fungi of *Hygrocybe*, *Entoloma*, *Clavariaceae* and others occurring mainly in old, poorly manured seminatural grasslands and forming an ecological group of distantly related taxa. These group of species is especially vulnerable to changes in land use such as ploughing, fertilization or reduction in grazing intensity (Jordal 1997, Arnolds 1999, Newton et al. 2003).

The study area is lying around the Dovre mountain massif in the northern part of Southern Norway (Figure 1). 138 localities were investigated. Localities in the southwest (Rauma, Lesja) mainly have an acid soil created by erosion of gneisses. The rest of the area (Sunndal, Oppdal, Midtre Gauldal, Dovre) has more or less calcareous soils created from different kinds of cambro-silurian rockbeds. The visited localities are mostly summer farms surrounded by seminatural grasslands which have either been mown and grazed, or only grazed. The localities are situated mainly 600-1100 m a.s.l. in the north boreal to low alpine vegetation region and in weakly oceanic to slightly continental vegetation sections. The size of the localities was mostly 0.2-1.0 hectare, but some localities were 2.0-3.0 hectares in extent.

The vegetation in the study area is described in more detail elsewhere. Of special interest is the wide variety of meadow types, some of which are recently described as threatened vegetation types by Fremstad & Moen (2001). Dry meadow community with *Avenula pubescens* is an important type in Sunndal and Oppdal up to at least 900 m a.s.l. One of the most abundant types, which is regarded as vulnerable, is the *Potentilla crantzii*/*Festuca ovina*-meadow. This type still occupies considerable areas and contains many rare and ecologically demanding species like *Botrychium lunaria*, *B. boreale*, *B. lanceolatum*, *Gentiana nivalis*, *Gentianella amarella*, *G. campestris*, *G. tenella*, *Primula scandinavica* and *Viola rupestris* ssp. *rupestris*.

### Methods

Most localities have been visited once or twice. The aim of the work has been to get a picture of biological diversity and conservation value in seminatural grasslands. Vegetation and species diversity of vascular plants is not further treated here. Species lists of fungi were taken by walking across the localities to get as complete species lists as possible. Frequencies of particular species in different altitudinal belts are calculated based on a larger study area in

northern parts of Southern Norway (see Jordal 1997). Most records are collected and deposited in the herbaria of Oslo or Trondheim.

## Results

The numbers of taxa and records of fungi are shown in Table 1.

**Table 1.** Number of taxa and records of different groups of fungi in the investigated localities. For further definitions of groups: see Jordal (1997).

Group	Taxa	Records
Grassland fungi (including pasture fungi)	144	1134
Pasture fungi (grassland fungi specialized in old seminatural grasslands)	70	509
Red list fungi	28	72
<i>Hygrocybe</i> species (important group of pasture fungi)	26	239
<i>Entoloma</i> species (important group of pasture fungi)	31	230

In total 1134 records of 144 taxa of grassland fungi were identified. The material further contains 509 records of 69 species and 1 variety of pasture fungi. 28 of the species are red listed in Norway (all of them were pasture fungi). Several of these are regarded as threatened in most parts of Europe (Jordal 1997). In the group of pasture fungi, species of the genera *Hygrocybe* and *Entoloma* are dominating in the collected material. Comparisons made with lowland localities in northern parts of Southern Norway indicate that species such as *Entoloma porphyrophaeum*, *Hygrocybe helobia*, *H. nitrata*, *H. salicisherbaceae*, *H. turunda* and *Melanoleuca subalpina* show a higher frequency in the subalpine areas compared to the lowlands.

## Discussion

The summer farm landscape in central mountain areas around Dovre is essential to a number of fungi. The total number of grassland fungi in Norway is estimated to be approximately 500 (Jordal 1997). The number of grassland fungi recorded in this study is about 30% of the estimated number in the whole country. It is a well known fact that many species of fungi have a southern distribution and are not to be expected in the study area. As defined by Jordal (1997), the total species number of pasture fungi in Norway is about 140. In this study 50% of these were found, which is a high proportion. In addition, there are 123 red listed species of grassland fungi known in Norway (Jordal 1997 p.76). Many of these have a limited distribution, often in the lowlands or the southern parts of the country. In the present study 28 red listed species were found which is 23% of the total number of the country. The summer farm areas seem to be especially important for species of the genera *Entoloma* and *Hygrocybe*. Some of these can be regarded as "summer farm species", with a higher frequency in the subalpine areas compared to the lowlands (Jordal 1997).

These results underline the national importance of the summer farm landscape as an important habitat for grassland fungi. The total conditions for continued land use, especially the economy of sheep grazing, is of strategic importance for maintenance of the seminatural grasslands where these species live. Maintaining these grasslands will be an important challenge for future management.

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