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Biodiversity of oribatid mites (Acari: Oribatida) along an altitudinal gradient in the Central Alps

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Abstract

Oribatid mite communities were studied in the Central Alps (Obergurgl, Tyrol, Austria). Samples were taken on four sites along an altitudinal gradient from 2050 m a.s.l to 2900 m a.s.l., in different vegetation units (pine forest, Nardetum, Caricetum, Androsacetum). A total of 86 species were found, most of them occurred only at one altitude, four species were found in all four study sites. Three taxa could not be ascribed to a certain species (*Carabodes* sp. *Mycobates* sp., *Tectocepheus* sp.). Species richness and density of oribatid mites decrease with increasing altitude. The results are compared with previous studies in the same region and show remarkable shifts in species composition.

Key words: Oribatida, faunistics, distribution, altitudinal gradient, species list, Central Alps, Austria

Introduction

High alpine ecosystems of the Central Alps have been a focus of research since a long time and numerous investigations with main attention on soil mesofauna have been carried out (e.g. Schweizer 1922, 1956; Handschin 1924; Schatz 1979; Schmölzer 1993; Kaufmann *et al*. 2002). Last comprehensive studies on distribution and ecology of oribatid mites in the same area of the Central high Alps have been conducted by Schatz (1978, 1979). He showed that species compositions at different altitudes are clearly distinguishable from each other. Unfortunately, there is a lack of recent studies addressing groups of mesofauna, although it would be important to monitor possible changes in species distribution, whether to address soil succession, climatic changes or other possible influences. The present study aimed to investigate the diversity and distribution of oribatid mite species along an altitudinal gradient in a high alpine region and to compare recent results with previous findings.

Material and Methods

Study sites. This study was conducted in Obergurgl/ Ötztal in the Tyrolean Central Alps. Prevailing parent rock is crystalline-slate silicate. In July 2010 samples were taken along an altitudinal gradient at four sites (2900 m, 2600 m, 2300 m and 2050 m). Descriptions of the study sites are based on Koch and Erschbamer (2010). Geographic coordinates given have been measured with a GPS (Garmin Oregon 550t).

Liebener Rippe (LR): N46°49.250', E11°03.339', 2900 m a.s.l. This rocky promontory is situated at the head of Rotmoos valley. Vegetation grows patchily, raw soils with pioneer vegetation and scarcely vegetated scree is interspersed with small-scaled grass patches and cushion plants. Typical plant communities are Androsacetum alpinae, *Sesleria ovata*-community, Elynetum myosuroides and Hygrocaricetum curvulae. Frequently occurring lichens are *Cetraria nivalis* and *Thamnolia vermicularis*. Soil developed on windblown sand.

Hohe Mut (HM): N46°50.081', E11°02.801', 2600 m a.s.l. Distinct mountain ridge above timberline with Caricetum curvulae, with shallow brown soil. Used for sheep-grazing.

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