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Geodiversity vs biodiversity in protected areas of Lithuania: examples, protection measures and problems

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As for many north-central European countries, the surface of Lithuania is sculptured by five glaciations which left behind morainic tills and melt water deposits, modified by erosion and later used for agriculture or overgrown by wild meadows or forests. The glaciations also left numerous erratic boulders and boulder fields that are declared as Natural Monuments in Lithuania and surrounding countries. Tens of single boulders and boulder fields are included into the geosites database at the Lithuanian Geological Survey. Though sparse, but of high scientific value, Devonian, Permian, Triassic and Jurassic outcrops and quarries of Lithuania are variably protected.

Quaternary scientists attempted to use single erratic boulders, boulder fields, and abundance in tills to infer glacier dynamics. Some erratics came from known localities in Scandinavia and are called indicator boulders because they allow to interpret the source and directions of ice sheet movement. Huge single boulders (e.g., 7 m long and 6 m high Puntukas, Anyksciai Regional Park) and boulder fields are Natural Monuments and attractive sites for visitors. Outcrops and quarries of Devonian dolostones and gypsum, Permian limestones, and Jurassic sandstones widely used for scientific research are part of the protected geodiversity in the Venta and Birzai Regional Parks in N and NW Lithuania.

On the other hand, a large part of the c. 700 species of lichenized and allied fungi, and of the c. 500 bryophytes known in Lithuania, are confined to natural or semi-natural (quarries) rocky habitats. Eight rock-dwelling lichen and nine bryophyte species are included in the Lithuanian Red List, some of them known from just 1–2 localities or probably already extinct. Recent investigations of dolostone quarries revealed they are habitats for 7 bryophyte, 8 lichenized and lichenicolous species, previously unknown for Lithuania. One new lichenicolous species was discovered [1]. Some of the newly found species are rare or absent in neighbouring countries.

In general, protection of geodiversity coincides well with protection of narrowly specialized cryptogams, e.g., overgrowing of tall herbs and shrubs in boulder fields has poor effects on rock-dwelling lichens. Shading of Devonian outcrops and quarries by trees and shrubs may obscure rocky surfaces and destroy lichens, but favour an establishment of sciophyllous bryophytes. There is no doubt that cleaning the surface of single boulders that are well-known nature monuments prevents the establishment and growth of lichens and bryophytes. However, most of the geological monuments which are subject to cleaning are located at sites undergoing strong anthropogenic impact, and therefore not suitable for settlement of the rare protected species. Even if conservation conflicts arise even when protecting different species of biota, not to mention conservation of biodiversity versus geodiversity, most of the conservation measures for geoh heritage in Lithuania are also suitable for rock-inhabiting lichens and bryophytes. Protection status and measures should be negotiated both by bio- and geoscientists, and legislation for the protection of all natural diversity should be improved, taking into account the value of

both biodiversity and geodiversity. More scientific research is needed on biodiversity and geodiversity interaction.

References:

[1] Khodosovtsev A et al. (2012) Nova Hedwigia, 95(1-2): 211-220.

