

Pedologic study of the the serpentinite hills in the Eastern Alps

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The Botanical Research Team of the University of West Hungary, in collaboration with the Faculty of Natural Sciences, funded by TAMOP 4.2.1.b. The project is funded by EU and co-financed by the European Social Fund and aims at studying the serpentine flora of Mount Kienberg, Bernstein, Austria.

Materials and methods

Floristic study of Kienberg-Bernstein was based on 6 km² area in all seasonal aspects. The surveys were performed on 10x10 m quadrats and Braun-Blanquet method with cover-abundance (%). In the *Pino-Festucetum ovinae* there were 104 registered species. From the plots soil sections were sampled and analysed.

Results and consequences

Pedological data

The basic rock of serpentinite soils is the metamorphic, ultramafic, Mg-rich serpentinite, originates from the Earth's mantle. The special elemental composition of serpentinite soils originates in the chemical composition of serpentinite rock. These soils hold edaphic (with pedologic, rather than climatic determination) phytocoenosis types, often with severe endemic species. These soils can be characterized by the relatively high level of substrate effect; low Ca/Mg ratio; relatively low amounts of N, P, K; the high heavy metal concentrations (e.g. Ni: 440-1180 mg/kg-1 at Bernstein). The soils of Mount Kienberg, Bernstein can be classified into the historic ranker group. In the WRB (IUSS Working Group WRB, 2006). these soils are *Hyperskeletal leptosol magnesic*, in the US. Soil Taxonomy (USDA, 1999): *Magnesian nonacid mesic lithic udorthents*. The rockiness was 65-85% (m/m). Based on the soil chemistry analyses, the premised soil chemical stress factors on the study sites are proved to exist.

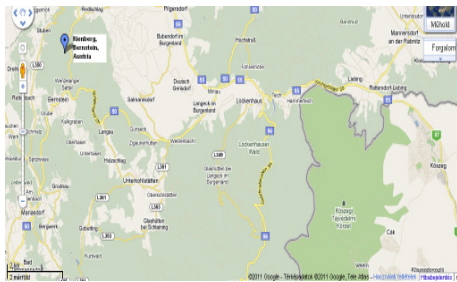


Figure 1: The site (Mount Kienberg) on the map.



Figure 2: Open mine of serpentinite on Mount Kienberg, Bernstein



Figure 4: Typical shallow soil section on Mount Kienberg

Sample No.	pH _{KCl}	Organic matter	CaCO ₃	P ₂ O ₅	K ₂ O	Na _{total}	Mg _{total}	Ca _{total}	Ca/Mg
		m/m%			mg/kg				
1/A	4.47	38.5	0.22	207	252	34.3	4650	8600	1.8
1/B	5.45	11.7	0.3	40.7	76.4	25.1	3160	3300	1.0
1/C	5.15	8.95	0.21	29.2	71.1	20.3	3690	2500	1.5
5/A	5.1	35.3	0.33	451	582	35.9	3390	7200	0.5
5/B	5.25	19.3	0.27	106	163	35.9	3080	4300	0.7

Table 1: soil chemistry data of typical Kienberg-Bernstein sites. Values supposed to be stress factors are in bold.

Sample No.	As _{total}	Cd _{total}	Cr _{total}	Cu _{total}	Hg _{total}	Ni _{total}	Pb _{total}	Zn _{total}	Al _{total}
	mg/kg								
1/A	4.75	0.72	748	15.3	0.38	441	80.5	65.8	7300
1/B	<1.00	<0.50	1480	13.3	<0.25	937	41.3	42.9	10100
1/C	<1.00	<0.50	1540	14.4	<0.25	1180	33	38.7	10300
5/A	3.11	1.1	1020	21.6	<0.25	636	72.4	82.6	7700
5/B	3	0.9	1560	16.6	<0.25	797	74.7	54.3	9700

Table 2: soil chemistry data of typical Kienberg-Bernstein sites. Values supposed to be stress factors are in bold.



Figure 3: Mixed forest on Mount Kienberg on serpentinite rock



Figure 4: Pygmy forest on Mount Kienberg: high level of edaphic stress limits the growth of trees.