

THE THREE-YEAR STUDY ON ACCUMULATION OF HEAVY METALS IN SAMPLES OF BIOTA GROWING IN THE FOREST AREAS OF SOUTHERN AND NORTH EASTERN POLAND

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ABSTRACT

The study concerns the comparison of the accumulation levels of selected heavy metals Mn, Ni, Cu, Zn, Cd and Pb in different elements of biota: epigeic moss *Pleurozium schreberi*, epiphytic lichen *Hypogymnia physodes*, birch *Betula* L. leaves and spruce *Picea abies* L. needles, growing on areas of different intensity of anthropogenic impacts. The research is focused on the assessment of the sources (primary and secondary) of contaminants accumulated in plants, the impact of ecosystems contamination, and seasonal changes on the concentrations of heavy metals in the studied biota samples.

The samples were collected three times each year, in spring, summer and autumn, on the areas of the southern Poland: in Beskidy Mountains, in Karkonosze Mountains and on slightly contaminated forest areas in the north-eastern Poland: Borecka, Knyszyńska and Białowieska Forests. The reference are the results of heavy metals and radionuclides designated in the samples of biota and soil collected on Spitsbergen (Svalbard Archipelago). For analysis were used 0.4 g of subsamples which were mineralized in mixture of nitric acid and hydrogen dioxide (1:3) using microwave digestion. Concentrations of Mn, Ni, Cu, Zn, Cd and Pb were determined with FAAS method.

The largest concentrations of heavy metals were determined in samples collected at the beginning of the growing season. This is probably the result of low emission during the heating season. The biggest lead concentrations were found in biota samples collected in Beskidy. Comparison of Zn, Cd and Pb mean concentrations indicates Beskidy and then the Karkonosze Mountains as the most vulnerable on these metals deposition. Samples with the lowest pollution level were collected in north-western areas of Poland. Also, the seasonal changes in the concentrations of metals were observed, but they varied between the years, which may be a result of differences in average winter temperatures during the study.

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