

THE USE OF COMPARISON FACTOR (*CF*) IN THE BIOMONITORING RESEARCH PERFORMED WITHIN THE FRAMEWORK OF THE PROJECT WICLAP IN SOUTH AND NORTH-EASTERN POLAND FOREST AREAS

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ABSTRACT

Biomonitoring research performed within the framework of the project WICLAP was carried out in the area of Svalbard and on the territories of southern and north-eastern Poland. In Poland, in different parts of biota: mosses, lichens, leaves, birch and spruce needles the concentrations of heavy metals were determined: Mn, Ni, Cu, Zn, Cd, Pb i Hg. The research was carried out in Beskids, Karkonosze Mountains and Borecka, Knyszyńska and Białowieska Forests. One of the objectives in the conducted research was to assess the heavy metals deposition. These areas differ in the level of anthropogenic pressure. Areas of north-eastern Poland are considered to be less polluted, being under the influence of distant emissions. All these areas are exposed to uncontrolled low emissions from local sources, and in the case of Knyszyńska Forest, to emission from Białystok city. In order to delimit areas under the influence of deposition of investigated metals the comparison factor (*CF*) was used. Comparison factor is the ratio of the difference of the analyte concentration in lichens and mosses to the mean analyte concentration in lichens and mosses. The value of the $CF = 0.62$ was taken as the limit above which a relatively high concentration of analyte accumulated in lichens may indicate its original deposition. For the study epiphytic lichens *Hypogymnia physodes* and epigeic mosses *Pleurozium schreberi* was used. The samples for testing were taken regularly during the years 2014-2016, at the start in the middle and at the end of the growing season.

In all the examined areas, at most places were the *CF* values for lead were higher than 0.62 recorded at the beginning of the growing season, which may be associated with an increased in low emission during the heating season. On average, during the growing season, the number of places for which the *CF* values for mercury were bigger than 0.62 increased or remained at a comparable level, which in turn may indicate the impact of distant emissions. The test results also show that the most loaded area in the Beskids area is located in southeastern direction from Sucha Beskidzka. According to the WHO report, the concentration of particulate matter PM_{2.5} in Sucha Beskidzka placed this town on the 7th place among the most polluted cities in Europe. The deposition of the investigated metals decreases in the sequence: Beskids > Karkonosze Mountains > forests in the northeastern Poland.

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