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# AIR POLLUTION OF THE BASE STATIONS OF THE INTEGRATED MONITORING OF NATURAL ENVIRONMENT IN 2011 ON THE BASIS OF HEAVY METALS AND SULPHUR CONCENTRATION IN LICHEN HYPOGYMNIA PHYSODES COLLECTED FROM NATURAL ENVIRONMENT

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*Summary*

In July 2011 at 8 Base Stations (Biała Góra, Storkowo, Puszcza Borecka, Wigry, Kampinos, Św. Krzyż, Roztocze, Szymbark) samples of lichen Hypogymnia physodes collected. They originated from natural condition environment, namely stations which were set up in 2001. After collection the lichen samples were analyzed for concentrations of heavy metals (Cd, Pb, Cu, Zn, Fe, Ni, Cr) and sulphur. The first with using AAS and in the latter turbidimetric method. The air pollution (both of $SO_2$ and heavy metals) of following Base Stations was varied and differed significantly among each other. The highest and most evident pollution was assessed for cadmium, particularly at 4 stations: Św. Krzyż, Roztocze, Kampinos and Szymbark, whereas the lowest was determined at Storkowo and Biała Góra. No statistical differences between those 4 stations were found. The highest lead concentration was found at Św. Krzyż Base Station, whereas half of this value was noticed in Szymbark, Roztocze and Biała Góra. The lowest air contamination by this metal was found in Storkowo and Wigry. What is interesting, air pollution by copper did not show such a variation among the stations, achieving similar concentration at all investigated Base Stations. Statistically highest comparing to contamination of other stations, was found for zinc at Św. Krzyż while the lowest at Biała Góra Base Station. Zinc pollution for other stations was moderate and rather stable. The high amount of iron in lichens was found in Szymbark and Św. Krzyż, the lowest in Storkowo, Puszcza Borecka and Wigry. The highest chromium concentration was determined in Szymbark, Św. Krzyż and Biała Góra while the highest nickel concentration in Kampinos and Biała Góra. The rest of the stations was characterized by rather a moderate concentration both chromium and nickel. In general, the lower cadmium, lead, zinc and iron concentrations were found in the northen than in southern part of Poland. The lowest air pollution by $SO_2$ in 2011 was found in Roztocze, Św. Krzyż and Wigry while the highest in

Szymbark and Biała Góra. In Puszcza Borecka, Storkowo and Kampinos air pollution by sulphur dioxide was similar. During a period of eleven years (2001–2011) state of air at investigated Base Stations has been slightly improved. In 2011 comparing to year of 2001 air pollution by lead has significantly improved at Kampinos, Storkowo, Puszcza Borecka and Wigry whereas in Szymbark and Św. Krzyż has not practically changed. At all Base Stations air pollution by copper lowered. At the same time statistically lower concentration of iron was noticed at Storkowo and Wigry whereas contamination by cadmium and zinc has not changed during this period. Sulphur dioxide pollution has increased in Szymbark, decreased at Św. Krzyż, while at other Base Stations has been stable without any alterations.