AIR POLLUTION STILL LIMITS EPIPHYTIC RECOLONIZATION: HEAVY METALS AND ECOPHYSIOLOGICAL PARAMETERS IN THREATENED FOREST MACROLICHENS OF CENTRAL EUROPE

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Air pollution and intensive forest management may heavily affect epiphytic organisms and limit habitat recolonization. The macrolichen *Lobaria pulmonaria* (L.) Hoffm was used to assess to what extent recent atmospheric pollution limits the survival of threatened forest epiphytes in Central Europe, by means of a transplant experiment (May 2016 – May 2017) of thalli saved from logged trees. The species was selected being an endangered forest lichen very sensitive to air pollution. It is considered as a "flag" indicator species of forest ecosystems with long ecological continuity worthy of conservation, often used as a model species, red-listed and legally protected in several European countries. The experiment was run in the Western Carpathians (Slovakia) where the species was spread over the country at the beginning of 20th century, while currently it is confined to remote areas of mountain ranges, due to air pollution and forest management. Forest sites (chiefly dominated by *Fagus*) were carefully selected with regard to the occurrence in the past (SW Slovakia) and to prevent the contact with local populations of *L. pulmonaria* thus limiting or excluding at all the potential erosion of local genetic diversity. The bioaccumulation of trace elements (Al, As, Cd, Cr, Cu, Mn, Ni, Pb, S, Sb, Zn) and the photosynthetic efficiency (expressed as chlorophyll *a* fluorescence emission) were used as respective proxies of the intensity of pollution and the vitality of lichen transplants before and after the exposure on the bark of *Fagus* trunks. Exposed to Control (EC) ratios were used to interpret the accumulation of heavy metals after the exposure period. A strong accumulation (EC>2) was locally reported for As, Mn, Pb, Sb and Zn. In such cases, lichen thalli also showed a partial alteration of their vitality. Relevant depositions of Sb were attributed to traffic from the main urban areas and Mn from local mining activities and geological outcrops. In general, a higher pollution load index – PLI (about 2.4) calculated accounting all investigated elements characterised those sites where the model species also showed a worse vitality, whereas a lower PLI (about 1.5) corresponded to the thalli with higher vitality. In this latter case, transplants developed new propagules and attached by themselves to the substrate. Using *L. pulmonaria* as a model species, the study suggested atmospheric pollution as one of the factors limiting the recolonization of threatened forest macrolichens in historically previously colonized habitats. The role of microclimatic features and other abiotic factors is currently under investigation.