



Lichens as indicators of the atmosphere state in the oil exploration district of Tomsk Region

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Lichens are widespread in the vegetative cover of West Siberia, particularly in the north. They play an important role in the migration and transformation of chemical pollutants. Lichens lack waxy cuticles and are largely dependent on the atmosphere for their water and nutrient uptake. Lichens are not only studied and used as indicators, but also as accumulators, e.g. for trace and heavy metals. In fact, lichens are known for their ability to accumulate airborne substances to concentrations far greater than in the atmosphere, and the element contents of lichen thalli proved to be directly correlated with environmental levels.

Monitoring of the atmosphere pollution using lichens is more efficient than that using snow cover. Because of the long lichen life it is possible to obtain persistent mean characteristics of the ecosystems state. Epiphytic lichens, growing on tree stems are more appropriate to use than that which grow on soil. Epiphytic lichens are more sensitive to changes of the chemical composition of the atmosphere. Pollutants penetrate in the lichen thalli from the atmosphere together with precipitations and dust. Moreover the precipitations are saturated with pollutants when going through crowns of trees and trickling down the stems and branches.

Lichen studies are especially important in territories subjected to excessive human activity. Because a great part of Tomsk region (West Siberia, Russia) is the territory of the oil-field exploration, there the atmosphere monitoring is a necessary part of the whole environmental monitoring.

The aim of this investigation is the estimation of the influence of oil exploration industry in Tomsk region on the atmosphere by means of the study of epiphytic lichens. Lichen samples were collected in August and September 2010-2011. Sampling net included seven areas distributed inside the oil-exploration districts of Tomsk region. In total 27 samples were collected. In these samples 53 chemical elements were detected by ICP-MS. Comparing the obtained results with the data of other Siberian regions (Yamal and Irkutsk regions) and also, Austria (Zemmering), Finland, Netherlands the authors have revealed excesses for Cr, Co, Zn, As, Rb, etc. three and more times.