PLANT ASSOCIATIONS AND ECOLOGICAL MONITORING OF SOUTHERN SPITSBERGEN

by

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Field studies were carried out in Southern Spitsbergen (Hornsund area) during the two successive expeditions in 1985 and 1986.

The studies were aimed at recognition of ecological processes taking place in Spitsbergen's tundra environment, evaluation of the condition of the tundra environment, and assessment of the level of main plant communities composing the Spitsbergen tundra.

Plant communities of a small watershed Ariekamen-Fugleberget were defined on the basis of 180 phytosociological records. Several lichen, moss and higher plant communities were distinguished. Plant communities of bird colonies appear to be the most interesting.

The content of heavy metals, nitrogen and phosphorus in two moss species (*Sanionia uncinata, Hylocomium splendens*) growing within the *Plautus alle* colony and outside the colony was determined. It was found that the mosses growing in the area of the bird colony accumulate more heavy metals and nutrients than the mosses occurring outside the colony.

It appears that the bird colonies provide the tundra ecosystem not only with nutritive, but also with polluting elements.

The level of heavy metals was defined in two successive links of the trophic chain, i. e., in vascular plants and in herbivorous birds (*Plectrofenax nivalis*). The concentration of metals was higher in birds than in plants. The greatest accumulation of heavy metals was found in bone and liver.

The content of heavy metals was determined in several moss and lichen species using the two as bioindicators of environmental pollution with these elements. It was found that the content of metals in the material collected in Spitsbergen is lower than in Central Europe and Southern Scandinavia. The mosses collected in Sweden 100 years ago contained, however, smaller amounts of metals than the mosses occurring at present in Spitsbergen. Consequently, even the territories of the far North are contaminated by industrial emissions.