Studies of pine phytocoenosis responses on heavy metal fallouts in field experiment

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So far forest ecosystem contamination with industrial pollutions is a significant factor of forest productivity decline and reduction in sufficient areas. Rating of its adverse impacts has a leading role in pollution scope limitation in a set of forest conservation and protection operations. For this reason we conducted field experiments to identify allowable heavy metals fallouts (for example zink) in pine ecosystems.

Controlled forest stand contaminations with zink were conducted ($Zn(NO_3)_2$ $7H_2O$) in young pine woods in the Vinogradovskoye forest dictrict in Moscow region.

It was found that industrial heavy metals fallout may result in sufficient breakdown of Scotch pine phytocoenossis growth and evolution. It is reflected in tree needle indicator damage and deterioration, its growth decrease, general tree decline and tree mortality growth, Scothc pine undergrowth natural regeneration decline.

Controlled field experiment results show that stable needle dehromation and its biometric indicator deterioration is visible at zink loads 90 g/м² (900 kg/га), and stand condition decline and linear growth reduction at 30 g/м² (300 kg/га).

At zink fallouts 90 g/м² (900 kg/га) practically irreversible changes in stand condition occur at under canopy natural regeneration.

Key words: *environmental contamination, heavy metals, zink, pine ecosystems, ground seed germinability, stand condition, tree growth, natural regeneration, man-made fallout rating.*