



Soil biochemical properties of grassland ecosystems under anthropogenic emission of nitrogen compounds

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Inflow of pollutants in terrestrial ecosystems nowadays increases dramatically, that might be led to disturbance of natural biogeochemical cycles and landscapes structure. Production of nitrogen fertilizers is one of the air pollution sources, namely by nitrogen compounds (NH_4^+ , NO_3^- , NO_2^-). Air pollution by nitrogen compounds of terrestrial ecosystems might be affected on soil biochemical properties, which results increasing mineral nitrogen content in soil, changing soil P/N and Al/Ca ratios, and, finally, the deterioration of soil microbial community functioning. The research is focused on the assessment of anthropogenic emission of nitrogen compounds on soil properties of grassland ecosystems in European Russia. Soil samples (Voronich Chernozem Pashic, upper 10 cm mineral layer, totally 10) were taken from grassland ecosystem: near (5-10 m) nitrogen fertilizer factory (NFF), and far from it (20-30 km, served as a control) in Tula region. In soil samples the NH_4^+ and NO_3^- (Kudeyarov's photocolometric method), P, Ca, Al (X-ray fluorescence method) contents were measured. Soil microbial biomass carbon (C_{mic}) was analyzed by substrate-induced respiration method. Soil microbial respiration (MR) was assessed by CO_2 rate production. Soil microbial metabolic quotient ($q\text{CO}_2$) was calculated as $\text{MR}/\text{C}_{\text{mic}}$ ratio. Near NFF the soil ammonium and nitrate nitrogen contents were a strongly varied, variation coefficient (CV) was 42 and 86. This study was supported by Russian Foundation of Basic Research Grant No. 14-04-00098, 15-44-03220, 15-04-00915.