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The changes of nitrate reductase activity in soils under Robinia pseudoacacia shelterbelt and in adjoining cultivated field

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The investigations were carried out in Dezydery Chlapowski Agroecological Landscape Park in Turew (40 km South-West of Poznań, West Polish Lowlands, 16˚45 E and 52˚01 N). Intensively agriculture is observed in this region. Characteristic features of this landscape are shelterbelts created in the XIX century by the general Dezydery Chlapowski.

Soil samples were taken from *Robinia pseudoacacia* shelterbelt and from adjoining cultivated field. This is 200 - years old shelterbelt consists mainly of *Robinia pseudacacia* and small admixture of *Quercus robur and Quercus petraea.* It is 2 kilometers length and 36 meters width. Shelterbelts and adjoining cultivated fields were introduced on Hapludalfs soils (according to FAO classification).

The aim of this study was to evaluate the effect of moisture and nitrogen concentrations on the changes of nitrate reductase activity in soil under shelterbelt and in adjoining cultivated field. The experiments were carried out in two different moisture content. The first was field-moist and the second was 15% moisture content. In this study three different contents of nitrogen in the form of urea (organic form of nitrogen) were investigated: field concentration, after addition of 0.25% and 0.5% of nitrogen. Activity of nitrate reductase changes in different interval of time were measured. Rate constant of reactions was calculated for the changes of nitrate reductase activity. Our results have shown that this process runs according to the equation rate of first–order kinetic reaction model. The first-order reaction rate constants increases with the changes of moisture content from field-moist to 15% in soil under shelterbelt. In soil under adjoining cultivated field raise of the moisture content from field-moist to 15% causes an increase of the first-order reaction rate constants higher than in soil under shelterbelt. The processes of the changes of nitrate reductase activity 15% moisture content of the soil under shelterbelt and in field-moist content of adjoining cultivated fields were similar. The addition of 0.25% nitrogen to soil under shelterbelt of 15% moisture content resulted in an increase of the first-order reaction rate constants. However, the addition of 0.5% nitrogen in this soil impacted on the decrease of the first-order reaction rate constant. The addition of 0.25% and 0.5% nitrogen to the soil under adjoining cultivated field with 15% of moisture content also increased significantly the first-order reaction rate constant.

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