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Activity of nitrate reductase in soils under shelterbelts of different age and adjoining cultivated fields

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The shelterbelts (mid field rows of trees afforestation) fulfill significant functions in agricultural landscape, mainly by decreasing wind erosion, increasing of water retention by the restricting surface runoff, isolation of polluting elements in the landscape, preservation of biological diversity in agricultural areas and limit also the spread of chemical compounds in agricultural landscape.

Significant source of mineral nitrogen in soil brings from the degradation of organic substances, mineralization, immobilization, leaching, root exudates and plant uptake. A conceptual view of the biochemical transformation of organic matter in soil concerns the amount of organic matter going through different stages of degradation, from coarse dead plant materials to evolved humified organic matter tens or hundreds of years old. Higher organic substances and moisture content in soil under old than young shelterbelt could promote the higher rate of denitrification.

During low content of oxygen nitrate ions are reduced to nitrite and this process is catalyzed by nitrate reductase. NO_2^- is farther reduced to N_2O by nitrite reductase. The conversion of N_2O to N_2 is catalyzed by nitrous oxide reductase. Finally this process leads to the lost of nitrogen in soil mainly in the form of N_2 and N_2O.

Three shelterbelts and adjoining cultivated fields were selected for this experiment. Two shelterbelts were created 200 years ago. It is consisting mainly by *Robinia pseudacacia* and small admixture of *Quercus robur and Larix decidua.* Second one consists of the *Crataegus monogyna*. Third new shelterbelt was created in 1993 and con-

sists of several species of plants such as: *Quercus petraea and Quercus robur, Larix decidua, Pinus sylvestris, Sorbus aucuparia, Sorbus intermedia and Tilia cordata.* All shelterbelts and adjoining cultivated fields were introduced on grey – brown podzolic soils.

Our results have shown that soils under shelterbelts and adjoining cultivated fields were very acidic and pH ranged from 3,2 to 5,3. Only soil from adjoining cultivated fields to *Robinia pseudacacia* shelterbelts belongs to weak acidic and pH ranged from 5,0 to 6,3.

Our investigations have shown the differences of activity of nitrate reductase in soil under shelterbelts and adjoining cultivated fields. The higher values activity of nitrate reductase observed under old and new shelterbelts than in adjoining cultivated fields. Activity of this enzyme under shelterbelts ranged from 0,12 to 0,3 $\mu gN \cdot g^{-1}$s.m.$\cdot 24h^{-1}$. Higher values of activity of nitrate reductase in soil under shelterbelts than adjoining cultivated fields indicate higher denitrification ability in these soils.