



## **Function of shelterbelt on the changes of nitrogen compounds in ground water and soils**

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Shelterbelts (mid-field rows of trees afforestation) and stretches of meadow have been shown to help the collecting water-borne movement of various chemical compounds from cultivated fields into the collecting eater basin. In addition shelterbelts belong to permanent elements in landscape, which restrain erosion in soil, separate agricultural fields from the watercourses, improve microclimate for agricultural production, regulate water ratio in soils and help in maintaining biodiversity of agricultural fields.

The investigations were carried out in soils under a 125 m long shelterbelt, located in the Agroecological Landscape Park in Turew (40 kilometers south of Poznań, West Polish Lowland). One part of this shelterbelt is allocated on mineral whereas the second part is on mineral-organic soil.

Different forms of nitrogen (total, organic, ammonium, nitrates, amino acids in dry mass and in humic acids) as well as total organic carbon, dissolved organic carbon, activity of urease in ground water and in soils under mild-field leaf afforestation were measured. The investigation has shown the impact of the kind of the soil and the distance from the edge of the shelterbelt on the changes of the total nitrogen content, average yearly concentration of ammonium and nitrate ions, activity of urease, as well as on the total amount of amino acids in humic acids, and the chemical structure of humic acids. The shelterbelt located on mineral soil acts in the direction of lowering nitrogen compounds in the soil with an increase in the distance from the edge of the shelterbelt, while the shelterbelt located on mineral-organic soil acts in the contrary

direction. Humic acids from mineral-organic soil under the shelterbelt are characterized by higher degree of condensation and aromatic polycondensation compared to those from mineral soils. For both kinds of soils, an increase in the distance from the edge of the shelterbelt is accompanied by a decrease in the degree of humification, or chemical maturity of humic acids. The transformation of different forms of nitrogen in the soil under shelterbelts is strongly connected with the humification process and the molecular structure of humic acids.

The ground water carried away from the fields to the afforestation contains high contents of organic chemical compounds. The leaf afforestation of 16.5 m wide effects on the decrease in the ground water of total organic substances, total nitrogen and free and bound amino acids to humic substances.