



## Impact of shelterbelts of different age on the chemical properties of soils and their function in agricultural landscape

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The abstract presents the results of investigations of ground waters and soils under shelterbelts and adjoining cultivated fields. The shelterbelts represent different ages and the content of plants as well as humus quantity in surface layer.

Object I: 160-years old shelterbelt, basic species is *Robinia pseudacacia* L.

Object II: about 100-years old shelterbelt, where predominant species is *Crataegus monogyna* Jacq.

Object III: 12-years old shelterbelt includes 13 species of trees.

The physicochemical properties of investigated soils revealed that specific surface areas ( $42.8 \text{ m}^2/\text{g}$ ), cationic sorptive capacity ( $24.8 \text{ cmol (+)/kg}$ ), TOC (4.3%) shelterbelt 160-years old were the highest in object III.

The contents of  $\text{N-NO}_3^-$ ,  $\text{N-NH}_4^+$ ,  $\text{P-PO}_4^{-3}$ ,  $\text{Ca}^{+2}$ ,  $\text{Mg}^{+2}$ , TOC were investigated in the ground water under shelterbelts and adjoining cultivated fields. However,  $\text{pH}_{KCl}$ , cationic sorptive capacity, specific surface areas, TOC were determined in soils.

The concentrations of chemical compounds were confirmed in ground water in system field-shelterbelt in objects I and II. The smallest contents of  $\text{N-NO}_3^-$  (3.35 mg/l) and  $\text{P-PO}_4^{-3}$  (0.02 mg/l) and also the highest concentrations of  $\text{N-NH}_4^+$  (2.63 mg/l),  $\text{Ca}^{+2}$  (440.09 mg/l) and  $\text{Mg}^{+2}$  (49.26 mg/l) were observed in ground water under the shelterbelt 160-years old. However in 12-years old shelterbelt the amounts of chemical substances in

ground water in system field-shelterbelt were similar.

The results revealed that the 160-years old shelterbelt characterizing developed organic matter significantly limits the spread of chemical compounds in ground water and sufficiently fulfils the function such as biogeochemical barrier in agricultural landscape.