THE DYNAMIC OF NUTRIENT CONCENTRATION IN THE GROUND WATER IN THE TERRAIN UNDER VARIED CROPS

Key words: biogenic compounds, grains, ground waters, meadows, NPK, vegetables

Summary

The long-term programme implemented by the Institute of Technology and Life Sciences (P.W. activity 1.3) began in April 2012. Monitoring of groundwater quality was carried out in the Malopolska loess areas for different field crops. The groundwater was analysed in the areas covered by the intensive cultivation of vegetables, moderately fertilized cereals and poorly fertilized and non-fertilized permanent meadows. The objective of the study was to determine concentration dynamics of the nutrients (NO$_3$-N, NH$_4$-N and PO$_4$-P) at various times of the year for the period of 2012–2014. Also potassium was included, as a component of basic fertilization.

In the vegetable cultivation, high NPK fertilization level was applied in the 4 sites, and doses per hectare were: 110–160 kg N, 70–90 kg P$_2$O$_5$ and 80–100 kg K$_2$O. Fertilization of cereal crops was smaller and amounted respectively: 60–80; 30–40; 60–80 kg per hectare. With two meadow sites, only in the one site, manure was applied every three years at the rate of 10 Mg·ha$^{-1}$. Based on the results of the chemical analyzes, it was found that NO$_3$-N concentration was greatest in groundwater under vegetable crops. Increased concentration of this nitrogen form was observed most frequently in the spring and the smaller in the summer. These waters are the most frequently corresponded to V-class quality and have been threatened or polluted by nitrates from the agricultural sources. In the case of cereal crops and grasslands, water quality was much better and the concentration of NO$_3$-N corresponds to I–III class. One of the reasons of very different concentration of this compound in the vegetable cultivation, may be the lack of plant cover in the autumn and winter, which favours the leaching the chemicals from the soil. The concentration of the remaining components from particular sampling points, corresponds to I–III class of the groundwater quality.