Reduction of groundwater pollution by nitrate-nitrogen with agrotechnical measures

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The largest reservoir of high-quality drinking ground water in Slovak Republic is situated in the Žitný Ostrov (the Rye Island) region. This region belongs to the Danubian lowland where the Quaternary deposit with thickness up to 350 m creates ideal conditions for water accumulation. Considering that these areas are also the areas with the most intensive crop production in our Republic, it is necessary to look for all available ways of protection these water resources from the pollution of nitrate-nitrogen (NO_3-N) as well (e.g. restriction or limitation of some agricultural activities in these areas).

One of the possible ways how to reduce penetration of NO_3-N to groundwater is also the systematic exploitation of different agriculture systems of soil use in concrete area on regulation of water-nitrate regime of soil (cover-protection layer of groundwater).

A few years research in the protection area of water resource Borovce, district Piešťany, deals with influence of different factors on distribution of moisture and content of NO_3-N in soil profile up to the depth of 3 m. The factors are: two different crop rotations, biological (A1) and cereal (A2), two different fertilization variants, manure fertilization (B1) and straw fertilization + NPK (B2) and two different ways of soil cultivation, conventional cultivation (C1) and protective cultivation (C2).

Results of these experiments inter alia showed that the crop rotation had the highest influence on the moisture profile. On the other hand, the influence of examined fertilization variants on the change of moisture was the smallest.

From the point of view of groundwater protection on this specific area, the best combination of variants was A1 B1 C2, i.e. biological crop rotation fertilized by manure and using protective cultivation.