

# INFLUENCE OF LONG-TERM APPLICATION OF FERTILIZERS AND AMELIORATIVE MEASURES ON SOIL PROPERTIES AND GRAIN YIELD

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## ABSTRACT

The influence of long-term fertilization and liming, on the changes of agro-chemical properties of acid soils and yields of grain of three winter wheat cultivars has been studied. The trials have been conducted on acid Pseudogley soil, during multi-year period, including control and two fertilization variants ( $N_{120}, P_{100}, K_{80}$ ;  $N_{120}, P_{100}, K_{80} + 4000 \text{ kg ha}^{-1} \text{ CaCO}_3 + 30000 \text{ kg ha}^{-1}$  stable manure). Long-term treatment by fertilizers and pedomeliorative measures, shows a significant effect on the changes of agro-chemical properties, especially in very acidic pseudogley, which is poor in buffering, with unfavorable and unstable chemical properties. The most significant changes in agrochemical soil properties considered: soil pH, soil adsorption complex composition and content of biogenous elements (P, K, Ca, Fe and Mn), as well as the content of toxic amounts of Al. Long-term periodical usage of chemical ameliorative substances (limestone and manure) together with the regular fertilizers has significantly reduced soil acidity (pH from 0.83 to 1.38); the amount of adsorbed base cations has increased for  $3.7 \text{ cmol}^+ \text{ kg}^{-1}$ ; V% for 22.89% and enhanced composition of adsorption complex. It has also given an average increased content of most nutrients (available phosphorus up to  $9.4 \text{ mg } 100 \text{ g}^{-1}$ ,  $6.3 \text{ mg } 100 \text{ g}^{-1}$ , calcium from 85 to  $105 \text{ mg } 100 \text{ g}^{-1}$ ), and the mobility of iron has been reduced for about 24%, manganese for over 100%, zinc for 41 % and particularly aluminum which content has been reduced from 13.61 to  $0.14 \text{ mg } 100 \text{ g}^{-1}$ ). As a result of improving of soil fertility the average yield of winter wheat has been tripled.

**Keywords:** Ameliorative, fertilizer, pseudogley, soil, yield, winter wheat