

INFLUENCE OF FERTILIZATION ON THE CONTENTS OF SIGNIFICANT COMPOUNDS IN SOIL APPLE-TREES ORCHARD

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The investigations were carried out in apple-trees orchard after replantation, which achieved in 1994 year in Agricultural and Horticultural Experimental Farm in Przybroda. This farm belongs to the Agricultural University in Poznań. Orchard was assumed on grey-brown podzolic soil, that was formed from medium sand; being behind on light loam. The Sampion apple-trees variety was cultivated. Three levels of fertilization were used: 65 kg/ha N; 65 kg/ha N and 95 kg/ha K₂O; 130 kg/ha N and 190 kg/ha K₂O. Besides within fertilization three combination of irrigation were also applied: W₀ – maintenance moisture on the level rainfall, W₁-maintenance moisture on the level 0,003 MPA potential water soil and also W₂- maintenance moisture on the level 0,001 MPA potential water soil. In the effect it gives 9 objects. Soil samples were uptaken and analysed in three following terms: intensive growth of apple-trees, fruiting/ripering and harvesting of fruits. The following chemical analyzes were done: organic carbon, dissolved organic carbon, activity of urease, as well as the concentrations of ammonium and nitrates.

In the first year of research considerable high contents of organic carbon in autumn (0,8-1,283%) and the lowest in summer (0,577-0,867%) were measured. However, the highest concentrations of organic carbon were found in combination of 130 kg/ha N and 190 kg/ha K₂O.

The concentrations of organic carbon in organic matter are connected with the contents of dissolved organic carbon. It is commonly know, that the content of dissolved organic carbon is the factor of microbiological activity in soils. The highest quantity of these compounds were noted in autumn after harvesting of fruits (53,365 - 93,44 mg/l) and the lowest content was observed in summer, in term of fruiting/ripering (30,595- 67,945 mg/l). However, the highest quantity of dissolved organic carbon was noted in combination of 130 kg/ha N and 190 kg/ha K₂O and the lowest in combination of 65kg/ha N.

It confirmed, that the highest activity of urease were similar like the concentrations of organic carbon and dissolved organic carbon in the period of harvesting of fruits and ranged 2,460-9,643 $\mu\text{g urea g}^{-1} \cdot \text{h}^{-1}$. The lowest activity this enzyme was observed in summer (0,920 - 2,140 $\mu\text{g urea x g}^{-1} \text{ x h}^{-1}$). Activity of urease was also high in combination of 130 kg/ha N and 190 kg/ha K₂O, and the lowest in combination of 65 kg/ha N.

This investigations revealed differences of mineral nitrogen (ammonium and nitrate) in soil fertilized with different doses of nitrogen and potassium. However, the highest amounts of NH₄⁺ and NO₃⁻ were observed in autumn during two times of simpling.

This results indicate the impact of trees and fertilizations on the content of different forms of nitrogen and as well as the microbiological activity in soils.