



THE EVOLUTION OF MAIN SOIL PHYSICAL AND CHEMICAL CHARACTERISTICS AS INFLUENCED BY TILLAGE SYSTEMS AND FERTILIZERS

EVOLUȚIA PRINCIPALE CARACTERISTICILE ALE SOLULUI FIZICE ȘI CHIMICE, INFLUENȚATĂ DE SISTEME DE CULTIVAT SI INGRĂSAMINTE

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The investigations conducted during 1986 – 2003 followed the influence of different soil tillage systems on yield and soil chemical and physical characteristics. Experiments were set up in split –split plots on a typical cambic chernozem of clay-loam texture, the mean humus content (3.3 %), a weakly acid reaction and a mean supply in mineral elements.

3After 24 years of experiments, ploughing at a depth of 20 cm resulted in settling of the soil layer at the depth of 19-27 cm, causing the increase in apparent density at 1.52 g/cm, decrease in total porosity at 43.3 % and increase in settling degree until 16,4 % of the volume.

3In case of chisel tillage, apparent density decreased from 1,41 to 1,33 g/cm, settling degree decreased at 0,8 % and hydraulic conductivity increased from 6,4 to 21,5 mm/hour at the depth of 40 cm.

The mean wheat yield obtained during 1986-2003 was of 3560 kg/ha at 20 cm ploughing, 3700 kg/ha at 30 cm ploughing, 3400 kg/ha in case of chisel and disk tillage and 3200 kg/ha in case of soil treatment by repeated disking. During that period, the mean wheat yield was of 1870 kg/ha under unfertilized, 3650 kg/ha at rate of N+ 80 kg/ha P802O5 and 4080 kg/ha at rate of N + 80 kg/ha P2O5120. Under drought, the application of fertilizers resulted in gaining yield increases between 63 % (1020 kg/ha) at rate of N80+ 80 kg/ha P2O and 86% (1390 kg/ha) at rate of N120 + 80 kg/ha P2O55. Compared to 20 cm ploughing, soil tillage at a greater depth, in case of wheat, resulted in getting low yield increases (240 kg/ha) in dry years, and in case of chisel + disk or only disk treatments, yields decreased only by 230 and 320 kg/ha, respectively. In maize grown under drought, the 30 cm ploughing resulted in getting yield increases, compared to 20 cm ploughing, of 12 % (600 kg/ha), chisel + disk tillage, 4,3 % (210 kg/ha) and disk tillage resulted in diminishing yield by 4,7 % (230 kg/ha). At maize growing, fertilizers were better capitalized under conditions of deeper soil tillage (ploughing at 30 cm; chisel + disk); they contributed to getting yield increases between 129 and 188 % (3190-4400 kg/ha), according to fertilizer rates applied.