

SOIL COMPACTION INFLUENCE ON WINTER WHEAT YIELD AND SOIL PHYSICAL PROPERTIES

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Abstract

Soil compaction is widespread and with current trends, its incidence is likely to increase. Tillage effects on soil properties are usually site specific and depend upon the interaction of soil and climatic conditions, with soil and crop management practices. Soil compaction is not a recent phenomenon. It was encountered in the form of plough-pans long before the advent of mechanized agriculture but in these days, current farming techniques exacerbate the risks. Field experiment were carried out in 2010-2011 at Ezareni – The Experimental Farm of the Agricultural University of Iasi, in the East side of Romania (47°07' N latitude, 27°30'E longitude), on a cambic chernozem (SRTS-2003, or haplic chernozems WRB-SR, 1998), with a clay-loamy texture, 6.8 pH, 2.7% humus content and a medium level of fertilization. Long-term amount of precipitation at this site is 517.8 mm at an average air temperature of 9.4°C. Wheat variety Fundulea 4 was grown at a sowing rate of 280 kg ha⁻¹. The experimental soil tillage systems were as follows: V1 – disc harrow , V2 – paraplow, V3 – chisel plow + rotary harrow, V4 – plough at 20 cm (control variant) and V5 – plough at 30 cm. The purpose of this study was to evaluate the influence of conventional and minimum tillage systems on winter wheat yield and soil physical properties in the pedoclimatic conditions of the Moldavian Plain. The mean of grain yield was significantly lower on all five tillage systems under unfertilized variant compared with the control treatment. Analyzing the fertilized variant (N₈₀P₈₀) the yield was significantly lower only in disk harrow (4830 kg ha⁻¹).

As regards soil bulk density, this indicator had the lowest value of the seeding time at 0-10 cm depth (1.13-1.21 g/cm³). The values increased on 10-20 cm layer, recording the greatest intensity in the disk harrow variant (1.39 g/cm³). Analyzing the annual average the biggest value has been recorded in disk harrow variant (1.34 g/cm³).

Key words: soil compaction, reduced tillage, yield

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