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THE INFLUENCE OF TILLAGE SYSTEMS UPON THE SOIL HUMIDITY

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SUMMARY

Our study presents the influence of conventional plough tillage system on water conservation in comparison with the alternative minimum tillage system: paraplow, chisel plow and rotary harrow (which 30% of the crop residue remains on the soil surface). The influence of tillage soil system upon water supply accumulated in soil was studied on Faeoziom Argic Stagnic Soil at the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. The tests were carried out between 2006 and 2007. The experimental field had a slope between 7-10%, characterized through annual average values of precipitations between 550-650 mm, and medium annual temperatures of 8.0-8.2^{O}C.

The complex processes of the soil are influenced by soil tillage systems directly related by the water movement in the soil. This is represented by a series of characteristic inducted to soil through the way of soil tillage: infiltration, percolation, astriction, capillary ascending, and water lose. The water reserve cumulated into soil, during the vegetation period is influenced by the type of soil tillage. The influence of the soil tillage upon the water accumulation into the soil is well distinguished through the high values of infiltration from 28.5 cm on the experimental variant tilled with plough to 29.6-35.7 cm/h on the minimum tilled experimental variants.

Table 1

The influence of soil tillage upon water reserve, infiltration and hidraulic conductivity

Statistical indicators		Plough	Chisel plow	Paraplow	Rotary harrow
Water reserve, m^3/ha **Wheat**	Average / %	868 / 100	885 / 102	882 / 102	871 / 100
	Diff ±/ significance	0.00 / Control	17 / ***	14 / **	3 / *
	DL (p 5%) = 5.26; DL (p 1%) = 8.68; DL (p 0.1 %) = 14.42				
Water reserve, m^3/ha **Maize**	Average / %	966 / 100	971 / 101	1009 / 104	943 / 98
	Diff ±/ significance	0.00 / Control	5 / ns	43 / **	-23 / ^{00}
	DL (p 5%) = 7.33; DL (p 1%) = 18.01; DL (p 0.1 %) = 73.52				
Water reserve, m^3/ha **Soy bean**	Average/ %	754 / 100	767 / 102	780 / 103	753 / 100
	Diff ±/ significance	0.00 / Control	13 / *	26 /**	- 1 / ns
	DL (p 5%) = 8.85; DL (p 1%) = 18.83; DL (p 0.1 %) = 94.50				
Infiltration, cm/h		28.5	35.7	29.6	30.6
Hydraulic conductivity, mm/h		16.52	17.42	18.41	16.41

Note: ns – not significant, ^{0} signification negatives, * significations positive.