

Water outflow and erosion losses of the humus-silicate soil

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Abstract: The aim of this investigation was to examine the quantitative indices of the humus-silicate soil erosion process. Average annual water runoff and average annual soil losses from the plot under fallow were 287.5 m³/ha and 26.48 t/ha, respectively. Annual water runoff from the plot under the autochthonous vegetation was 123.7 m³/ha water, causing the erosion intensity of 0.01 t/ha/year.

Key words: water runoff, erosion losses, humus-silicate soil

INTRODUCTION

Significant soil losses throughout the world are affected by enhanced different-intensity soil erosion process. As regards the total soil areas in Serbia, 86.41 % soil is hit by soil erosion (KOSTADINOV, 1994). According to DJOROVIC (1975), 44 % agricultural soil and 67 % of the total wooded area in the region of Serbia are affected by erosion.

Experimental plots have been set up in the Kamenica River Basin, situated in the Western Serbia region, in order to determine the intensity of erosion of the most widespread soil in the Basin, the humus-silicate soil profile type A_n – C.

MATERIALS AND METHODS

Quantitative values of water runoff and soil losses resulting from erosion over a three-year study period were determined using a method on an experimental plot under fallow and that under autochthonous vegetation hit by erosion (GAVRILOVIC, 1972).

The total water amount and suspended soil material were poured from collecting containers into glass bottles and then taken to laboratory, where their amounts were established using special methods.

Precipitation height as well as precipitation duration were recorded by precipitation meter on the experimental plots.

RESULTS AND DISCUSSION

Over the three-year soil erosion investigation, precipitation sum was recorded during the first, second and third hydrological years being 680.6 mm, 608.8 mm and 484.0 mm, respectively (Tab. 1). Water runoff from the plots was caused only by some of the sums.

Table 1. Water runoffs (l/m^2) and soil material losses (gr/m^2) from experimental plots in the Kamenica River Basin (1994/95 – 1996/97)

Hydrological year	Precipitation height, mm	Fallow		Autochthonous vegetation	
		Water runoff, l/m^2	Soil material loss, gr/m^2	Water runoff, l/m^2	Soil material loss, gr/m^2
1994/95	680.6	16.70	2879.31	4.07	2.74
1995/96	608.8	39.53	3428.57	20.06	0.19
1996/97	484.0	30.03	1637.37	12.98	0.00
Total		86.26	7945.25	37.11	2.93
Average		28.75	2648.42	12.37	0.98
Mean Annual Value, m^3/ha and t/ha		287.5	26.48	123.7	0.01

287.5 m^3/ha runoff water on average from the fallow plot was recorded annually, resulting in annual soil losses of 26.48 t/ha (Tab.1) being 2.15 times higher than the upper erosion tolerance limit of 12.3 t/ha per year recorded by Wischmeir, W. H. et Smith, D. D. (cited by Djorovic, 1975).

The average annual amount of water runoff from the plot under autochthonous vegetation was 123.7 m^3/ha water, being 2.32 times lower than the fallow-plot-related runoff, causing erosion of 0.01 t/ha soil per year (Table 1).

Average annual amount of soil eroded from the experimental plot under fallow was 2648 times higher than that from the plot under autochthonous vegetation, pointing out need for soil protection from the erosion process.

CONCLUSIONS

Average annual precipitation-affected water runoff from experimental fallow plots set up on the humus-silicate soil in the Kamenica River Basin was 2.32 times higher than that from the plot under autochthonous vegetation on the mentioned soil, whereas average annual soil losses from the fallow plot were 2648 times higher than the losses from the plot under autochthonous vegetation.

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