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# Straw mulch impact on soil properties and initial soil erosion processes in the maize field

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Soil erosion by water is the most important cause of land degradation. Previous studies reveal high soil loss in conventionally managed croplands, with recorded soil losses high as 30 t $ha^{-1}$ under wide row cover crop like maize (Kisic et al., 2017; Bogunovic et al., 2018). Therefore, it is necessary to test environmentally-friendly soil conservation practices to mitigate soil erosion. This research aims to define the impacts of mulch and bare soil on soil water erosion in the maize (Zea mays L.) field in Blagorodovac, Croatia (45°33'N; 17°01'E; 132 m a.s.l.). For this research, two treatments on conventionally tilled silty clay loam Stagnosols were established, one was straw mulch (2 t $ha^{-1}$), while other was bare soil. For purpose of research, ten rainfall simulations and ten sampling points were conducted per each treatment. Simulations were carried out with a rainfall simulator, simulating a rainfall at an intensity of 58 mm $h^{-1}$, for 30 min, over 0.785 $m^2$ plots, to determine runoff and sediment loss. Soil core samples and undisturbed samples were taken in the close vicinity of each plot. The results showed that straw mulch mitigated water runoff (by 192%), sediment loss (by 288%), and sediment concentration (by 560%) in addition to bare treatment. The bare treatment showed a 55% lower infiltration rate. Ponding time was higher ($p < 0.05$) on mulched plots (102 sec), compared to bare (35 sec), despite the fact that bulk density, water-stable aggregates, water holding capacity, and mean weight diameter did not show any difference ($p > 0.05$) between treatments. The study results indicate that straw mulch mitigates soil water erosion, because it immediately reduces runoff, and enhances infiltration. On the other side, soil water erosion on bare soil under simulated rainstorms could be high as 5.07 t $ha^{-1}$, when extrapolated, reached as high as 5.07 t $ha^{-1}$ in this study. The conventional tillage, without residue cover, was proven as unsustainable agro-technical practice in the study area.

**Key words: straw mulch,** rainfall simulation, soil water erosion

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