

Influence of Cultivation and Cropping Systems on Production of Soil Sediment on Agricultural Land

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Soil conservation practices and in particular soil tillage and crop cultivation patterns are becoming an important issue in agricultural production. Combating soil erosion and diminishing its negative impact on agricultural soil imposes as a matter of vital interest which gained even greater significance, in a pronounced negative impact of climate change. Main objective of the three-year research and monitoring program was to evaluate the effects of the easy-to-use adaptive measures on intensity of soil erosion, and soil properties considering to be of crucial importance on run-off velocity and sediment loss, like: soil structure stability, soil infiltration rate, soil organic matter and soil moisture conservation.

The influence of soil tillage practices and different cropping systems on soil intensity and sediment loss, has been monitored on specially designed soil erosion fields with standard dimensions (20m length x 4m. width), on a sloppy terrain (12% slope). The experimental field is located on heavily textured Chromic cambisol on saprolite. This is the predominant soil type on the sloppy terrains in the country, usually under intensive agricultural activities. Soil texture and physical characteristics were thoroughly investigated in order to determine the base soil conditions.

The influence of downslope and contour ploughing on quantity of eroded sediment has been monitored in three consecutive years. The eroded sediment has been collected periodically on a weekly base and after intensive rainfalls. The intensity of soil erosion under most widespread cropping systems in the country, like: a) cereals as a monoculture, b) crop rotation, and c) perennial grass, was monitored as well. The collected sediment was examined in order to determine the quantity of soil organic matter and nutrient loss (nitrogen, phosphorus and potassium). Soil chemical properties are examined after each vegetative season in order to quantify the effect of tillage and cropping systems on soil properties.

There are significant differences in the three years of investigations in terms to the quantity of eroded sediment within some of the variants, which is due to differences in the hydrological conditions, especially in 2014 and 2015. Also, there are substantial differences between variants (different systems of tillage and cultivation) as well. In the case of tillage systems these differences vary in a scale of 1: 6,06 (in 2013) up to 1:13,33 (in 2015). Significant differences have been noticed between different cropping systems as well.

Key words: sediment loss, tillage, adaptation measures, soil conservation, soil erosion