



Effect of tillage history on soil surface roughness decay

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Soil surface roughness in agricultural fields is mainly influenced by tillage operations, vegetation, soil type and erosion/deposition induced by previous rainfall. Other less dominant factors influencing roughness may be wind and wetting/drying or freezing/thawing. The effect of tillage history on soil surface roughness changes during rainfall has received until now less attention. The objective of this work was to analyze roughness decay after an identical tillage operation in plots with different tillage histories. This study was carried out on the Santa Catarina highlands, southern Brazil, between June 2005 and March 2006. During the five and half years period previous to start our experiment, the four different tillage treatments (two replications) were: bare soil (BS), conventional tillage (CT), common no-tillage (NT) and no-tillage on burnt crop residues (NT-B). In the cultivated treatments the crop sequence was: oats, soybean, vetch, maize, oats, beans, fodder radish, soybean, vetch, maize and oats. In June 2005 the experimental field was chisel-ploughed. Subsequently five height energy rainfall (64 mm h^{-1}) events were applied using a rotating-boom rainfall simulator. In addition cumulative 108 mm natural rainfall was recorded among simulation events. Soil microrelief was assessed by a pinmeter in a 3 cm grid. Measurements were taken in the initial soil surface, just after chisel ploughing and after each event of simulated rainfall. Soil surface roughness was described by: random roughness, tortuosity, limiting difference and limiting slope. These indices allow roughness decay evaluation as a function of previous treatment. The main differences were between the bare soil and the other three vegetated treatments.

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