Geophysical Research Abstracts
Vol. 18, EGU2016-12234, 2016
EGU General Assembly 2016

Can conservation agriculture reduce the impact of soil erosion in northern Tunisia ?

Haithem Bahri (1), Mohamed Annabi (2), Roukaya Chibani (1), Hatem Cheick M'Hamed (2), and Taoufik Hermessi (1)

(1) National Research Institute for Rural Engineering, Water, and Forestry- Ariana, Tunisia (haithem.bahri@gmail.com), (2) National Institute for Agronomic Research in Tunisia, Ariana, Tunisia- Ariana, Tunisia (mannabi@gmail.com)

Mediterranean countries are prone to soil erosion, therefore Tunisia, with Mediterranean climate, is threatened by water erosion phenomena. In fact, 3 million ha of land is threatened by erosion, and 50% is seriously affected. Soils under conservation agriculture (CA) have high water infiltration capacities reducing significantly surface runoff and thus soil erosion. This improves the quality of surface water, reduces pollution from soil erosion, and enhances groundwater resources. CA is characterized by three interlinked principles, namely continuous minimum mechanical soil disturbance, permanent organic soil cover and diversification of crop species grown in sequence or associations. Soil aggregate stability was used as an indicator of soil susceptibility to water erosion. Since 1999, In Tunisia CA has been introduced in rainfed cereal areas in order to move towards more sustainable agricultural systems. CA areas increased from 52 ha in 1999 to 15000 ha in 2015.
The objective of this paper is to study the effect of CA on soil erosion in northern Tunisia. Soil samples were collected at 10 cm of depth from 6 farmers' fields in northern Tunisia. Conventional tillage (CT), CA during less than 5 years (CA<5 years) and CA during more than 5 years (CA>5 years) have been practiced in each farmers field experiment of wheat crop. Soil aggregate stability was evaluated according to the method described by Le Bissonnais (1996), results were expressed as a mean weight diameter (MWD); higher values of MWD indicate higher aggregate stability. Total organic carbon (TOC) was determined using the wet oxidation method of Walkley-Black. A significant increase in SOC content was observed in CA>5years (1.64 %) compared to CT (0.97 %). This result highlights the importance of CA to improve soil fertility. For aggregate stability, a net increase was observed in CA compared to CT. After 5 years of CA the MWD was increased by 16% (MWD=1.8 mm for CT and MWD=2.1 mm for CA<5years). No improvement of aggregate stability level was observed after the 5th year of CA conversion. A positive correlation was observed between aggregate stability and total soil organic carbon (r=0.52, n=18). It is assumed that this correlation could be due to increased microbial activity under CA. A positive and statistically significant relationship was also noted between aggregate stability and the number of years after the no-till conversion (r= 0.46, n=18) for all plots.