Geophysical Research Abstracts
Vol. 19, EGU2017-2495, 2017
EGU General Assembly 2017

Georeferenced measurement of soil EC as a tool to detect susceptible areas to water erosion.

Leonardo Fabian Sallesses, Virginia Carolina Aparicio, and Jose Luis Costa
EEA INTA Balcarce. Argentina. Soil and water quality and management group. (sallesses.leonardo@inta.gob.ar)

The Southeast region of Buenos Aires Province, Argentina, is one of the main region for the cultivation of potato (Solanum tuberosum L.) in that country. The implementation of complementary irrigation for potato cultivation meant an increase in yield of up to 60%. Therefore, all potato production in the region is under irrigation. In this way, the area under central pivot irrigation has increased to 150% in the last two decades. The water used for irrigation in that region is underground with a high concentration of sodium bicarbonate. The combination of irrigation and rain increases the sodium absorption ratio of soil (SARs), consequently raising the clay dispersion and reducing infiltration. A reduction in infiltration means greater partitioning of precipitation into runoff. The degree of slope of the terrain, added to its length, increases the erosive potential of runoff water. The content of dissolved salts, in combination with the water content, affect the apparent Electrical Conductivity of the soil (EC), which is directly related to the concentration of Na + 2 in the soil solution.

In August 2016, severe rill erosion was detected in a productive plot of 300 ha. The predecessor crop was a potato under irrigation campaign. However the history of the lot consists of various winter and summer crops, always made in dry land and no till. Cumulative rainfall from harvest to erosion detection (four months) was 250 mm.

A georeferenced EC measurement was performed using the Verys 3100® contact sensor. With the data obtained, a geostatistical analysis was performed using Kriging spatial interpolation. The maps obtained were processed, dividing them into 4 EC ranges. The values and amplitude of the CEa ranges for each lot were determined according to the distribution observed in the generated histograms.

It was observed a distribution of elevated EC ranges and consequently of a higher concentration of Na+ 2 coincident with the irrigation areas of the pivots. These areas presented the highest occurrence of clay dispersion and rill erosion. This would indicate that with one campaign of cultivation of potato under supplementary irrigation are given the conditions that facilitate erosive events.

The georeferenced measurement of EC by contact ground sensors and their visualization through digital cartography could be an interesting tool to detect areas susceptible to erosive events. This information would help in decision making for a soil management that tends to avoid or reduce soil losses due to deterioration of physical and chemical properties by the incorporation of sodium by irrigation.

Key words: Irrigation, soil sodium, erosion.