Geophysical Research Abstracts
Vol. 14, EGU2012-11500, 2012
EGU General Assembly 2012

Soil properties evolution after irrigation with reclaimed water

M. Leal (1), V. González-Naranjo (1), A. de Miguel (1), V. Martínez-Hernández (1), and J. Lillo (2)

(1) IMDEA Water, Alcalá de Henares, Spain (maria.leal@imdea.org, victor.naranjo@imdea.org, angel.demiguel@imdea.org, virtudes.martinez@imdea.org, +34918305962), (2) University Rey Juan Carlos, Móstoles, Spain (javier.lillo@urjc.es, +34914887016)

Many arid and semi-arid countries are forced to look for new and alternative water sources. The availability of suitable quality water for agriculture in these regions often is threatened. In this context of water scarcity, the reuse of treated wastewater for crop irrigation could represent a feasible solution. Through rigorous planning and management, irrigation with reclaimed water presents some advantages such as saving freshwater, reducing wastewater discharges into freshwater bodies and decreasing the amount of added fertilizers due to the extra supply of nutrients by reclaimed water.

The current study, which involves wastewater reuse in agriculture, has been carried out in the Experimental Plant of Carrión de los Céspedes (Sevile, Spain). Here, two survey parcels equally designed have been cultivated with Jatropha curcas L, a bioenergetic plant and a non-interfering food security crop. The only difference between the two parcels lies on the irrigation water quality: one is irrigated with groundwater and another one with reclaimed water. The main aim of this study focuses on analysing the outstanding differences in soil properties derived from irrigation with two water qualities, due to their implications for plant growth.

To control and monitor the soil variables, soil samples were collected before and after irrigation in the two parcels. pH, electrical conductivity, cation exchange capacity, exchangeable cations (Ca2+, Mg2+, Na+ and K+), kjeldahl nitrogen, organic matter content and nutrients (boron, phosphorus, nitrogen, potassium) were measured. Data were statistically analyzed using the R package. To evaluate the variance ANOVA test was used and to obtain the relations between water quality and soil parameters, Pearson correlation coefficient was computed. According to other authors, a decrease in the organic matter content and an increase of parameters such as pH, electrical conductivity and some exchangeable cations were expected. To date and after one year of irrigation, no significant differences have been found among the soil properties of the two parcels. The results show in one hand, a slightly decrease in phosphorus, nitrates and electrical conductivity and on the other hand, an increase of organic matter. These trends should be contrasted by new soil quality measurements.

The implications on vegetation growth, oil production and nutrients assimilation derived from the irrigation with reclaimed water should be also evaluated over time.