



Degradation and Improvement of Argiudolls in Centre Santa Fe (Argentina): Changes in Physical and Chemical Soil Properties and in its Productive Capacity Using a sSmulation Model of Crop Growth

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Traditional tillage without adequate crop rotation and restoration of nutrients had generated degradation of the soils in Santa Fe. For this reason, it is important to find alternative systems to improve them. The A horizon of a typical Argiudoll of the centre of Santa Fe was chosen in 1983 and 2003 to evaluate: (a) physical and chemical properties of the natural soil (SN), (b) level of deterioration or improvement of those properties due to the management system (LC: traditional till during 50 years with the last 15 years of wheat-soya; RAG: crop-grass rotation under no-till with partial reposition of N, P and S), (c) productive capacity (CP) of the SN and the soil changes according to its management (LC and RAG). Soil data were introduced into a model of crop production (FitoSim), using corn as pattern and 30 years of meteorological data, to evaluate the effect of the soil use on the productive capacity. LC and RAG significantly differ from SN. The former have smaller values of CO, Nt, P e, pH, Ca, K, soil bulk density, relative aggregates stability, least limiting water range and crust infiltration. However the indexes are worse in LC. RAG has greater values of P, Nt and particulate N. The mean potential yield was 16200 kg/ha. The index of production capacity of SN was 75%, i.e. the limitations of the soil and rain only allow taking advantage of 75% of the environment potential capacity. In LC that loss reached 72%. The loss of productive capacity of the evaluated management systems was 21 and 69% for RAG and LC, standing out that although RAG is degraded with regard to the SN, however it is a more conservationist management system than LC.

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