
Abstract number 74 - COVER CROPS VERSUS FALLOW: WATER, NITROGEN AND SALINITY INTEGRATED FOR A MORE SUSTAINABLE IRRIGATED SYSTEM

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Nitrate leaching beyond the root zone can increase water contamination and decrease crop available N. Cover crops (CC) used in spite of fallow are an alternative to reduce nitrate contamination, because reducing drainage and soil mineral N accumulation. CC can improve important characteristics in irrigated land as water retention capacity or soil aggregate stability. However, increasing evapotranspiration and consequent drainage reduction, could lead to soil salt accumulation. Salinity affects more than 80 million ha of arable land in many areas of the world, and is one of the principal causes for yield reduction and even land degradation in the Mediterranean region. Few studies dealt with both problems at the same time. Therefore, it is necessary an evaluation of the potential effect on soil salinity and nitrate leaching, in order to ensure that potential disadvantages are compensated with all advantages of CC.

A study of the soil salinity and nitrate leaching was conducted during 4 years in a semiarid irrigated agricultural area of Central Spain. Three treatments were studied during the intercropping period of

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maize (*Zea mays* L.): barley (*Hordeum vulgare* L.), vetch (*Vicia villosa* L.) and fallow. CC were killed in March, maize sown in April, and all treatments were irrigated and fertilised following the same procedure. Before sowing, and after harvesting maize and CC, soil salt and nitrate accumulation was determined along the soil profile. The electrical conductivity of the saturated paste extract and soil mineral nitrogen was measured in each depth. A numerical model based on the Richards equation was applied in order to calculate drainage, using daily soil water content measurements, measured with capacitance probes. Results showed that drainage was minimized during the irrigated period, because water adjust to crop needs, leading to soil salt and nitrate accumulation on the upper layers after maize harvest. Then, during the intercrop period, most of salt and nitrate leaching occurred. CC use shortened drainage period, lowered drainage water amount and lowered nitrate and salt leaching than fallow. These effects were related with a larger nitrate accumulation in soil upper layers after CC treatments. But there was not soil salt accumulation increase in treatments with CC, even decreasing after years with large CC biomass production. Then, adoption of CC in this irrigated cropping system reduced water drainage beyond the root zone, salt and nitrate leaching diminished as a consequence but did not lead to salt accumulation in the upper soil layers.