



S02.03-P -16

PEDOTECHNIQUES STRATEGIES TO IMPROVE SOIL RESILIENCE AGAINST THE IMPACT OF IRRIGATION BY MUNICIPAL WASTEWATER: USING ZEOLITIZED TUFFS AS SOIL AMENDMENTS

Buondonno Andrea^{*[1]}, Capra Gian Franco^[2], Duras Maria Giustina^[2], Coppola Elio^[1], Grilli Eleonora^[1], Leone Antonio^[3], Vacca Sergio^[2]

^[1]Seconda Università di Napoli ~ Dipartimento di Scienze Ambientali ~ Caserta ~ Italy ^[2]Università di Sassari ~ Dipartimento di Scienze Botaniche, Ecologiche e Geologiche ~ Nuoro ~ Italy ^[3]ISAFoM ~ CNR ~ Ercolano ~ Italy

A research was started aiming at evaluating the possible use of natural zeolites as exchange conditioners to improve and make durable the soil resilience against the adverse effects of the use of anomalous wastewater, for irrigation purposes. To satisfy such aims, two zeolitized tuffs (ZTs), viz. a Neapolitan yellow tuff (NYT) and a clinoptilolite bearing tuff (ZCL), were tested as pedotechnical materials to improve soil resilience against the impact of treatment by a 'dirty' municipal wastewater (DMW). Soils were a sandy, alkaline Entisol, and a sandy-loam, sub-acidic Alfisol. Results showed that the presence of ZTs resulted in several favourable effects. EC decreased and pH was buffered. COD, total N and total P greatly decreased in the supernatant as ZTs content into the soil/zeolite models increased. Nitrate was greatly removed from solution likely via bio-chemical reaction thus preventing ground water pollution. Ammonium was selectively taken up from the DSW, making the zeolitized tuffs almost saturated by NH₄⁺, by exchanging both beneficial cations, such as K⁺ and Ca²⁺, thus improving their potential availability to plants, and undesirable cations such as Na⁺, thereby hindering the exchangeable sodium percentage (ESP) increase and concurrent soil salinization-alkalinization. The mobility of Pb, Cu and Zn dropped off to a large extent. On the whole, the results obtained highlight the possible positive role played by zeolitized tuffs in pedotechnique strategies to improve soil functionality, and should lead us to broaden the study focusing on soils and zeolitized material with different natures and properties.