



Phytostabilization assisted by amendments: a low cost alternative for mine soil reclamation in Cartagena-La Unión

A. Zanuzzi, A. Faz

Soil and Water Use, Management and Remediation Research Group. Departamento de Ciencia y Tecnología Agraria. Universidad Politécnica de Cartagena. Paseo Alfonso XIII, 52. 30203 Cartagena, Murcia, Spain. (andrea.zanuzzi@upct.es, angel.fazcano@upct.es)

The intense mining activity carried out in Cartagena-La Unión Mountain, Southeast Spain, caused extremely high accumulation of heavy metals in soils. These lands showed great risks for the surrounding environment due to the strong eolic and hydric erosion processes. The use of a vegetation cover gives a cost-effective and environmentally sustainable method for stabilising and reclaiming mine lands. Phytostabilization can be achieved by selective planting in combination with soil amendments. Even though the natural plant species of this area are adapted to the shortage of water and scarcity of nutrients, it is necessary to reduce the availability of heavy metals and thus their toxicity, and also to neutralize soil acidity for obtaining a successful plant growth. Wastes addition as soil amendments has been selected as a feasible low-cost remediation method for the study area. The addition of pig manure or sewage sludge in combination with lime (marble industry waste product) provided plant nutrients and reduced acid drainage and also heavy metal mobilization and toxicity. Results showed an increase in pH, total nitrogen, organic carbon, and equivalent calcium carbonate contents; and a reduction of DTPA and water extractable metals. Amendments also exert significant positive effects on plant establishment. Species such as, Zygophyllum fabago, Piptatherum miliaceum, and Ditrichia viscosa, that grew in the proximity of the study area, grew naturally on the plots. Improvement of physicochemical properties as a result of amendments addition enhanced the establishment of a plant cover. As a consequence, the decreased of associated risks and plant growth, promoted the stabilization of the studied mine lands.