

Organic amendments and mulches influence the quality of restored mine soils and plant cover in semiarid regions.

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An experimental restoration was designed in a calcareous quarry in Sierra de Gádor, SE Spain, with the aim of determining useful semiarid restoration techniques. The factors tested were: a) organic amendments (sewage sludge, compost and no amendment), b) mulches (gravel, woodchip and no mulch), and c) three native species (*Macrochloa tenacissima*, *Anthyllis terniflora* and *Anthyllis cytisoides*). Nine combinations of organic amendments and mulches were established in plots of 15 x 5 m and 75 plants were planted in each plot. Plant survival and growth were measured at months 6, 24, 36 and 48 after planting. Moreover, the possible relationships between soil quality indicators (physico-chemical and microbiological properties, aggregate stability and infiltration rate) and changes in the planted vegetation caused by restoration treatments were explored. This study demonstrated that opencast mine revegetation with native species (*M. tenacissima*, *A. terniflora* and *A. cytisoides*) was successful in the boundary between arid and semiarid climate in only four years, compared to previous soil restoration treatment. The response of plant species was different, showing their own physiological mechanisms. *M. tenacissima* presented the highest survival rates although the two *Anthyllis* species had the highest growth rates. Despite organic amendments had not a positive effect on plant survival, these treatments increased plant growth. In particular, the improvement on chemical, microbiological and physical soil properties induced by sewage sludge and especially compost treatment, enhanced plant growth. However, changes induced by mulches on the physico-chemical soil properties did not provided clear evidences, either positive or negative, in plant establishment. Thus, the addition of organic matter from organic residues and revegetation with native species can improve the restoration success in SE Spain and perhaps similar regions worldwide under arid-semiarid climate.