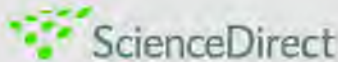


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Natural and man-induced revegetation on mining wastes: Changes in the floristic composition during early succession

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ABSTRACT

The performance of introduced species when interacting with colonising herbs and shrubs from the surrounding areas has become an important issue in plant ecology and restoration management. In this paper, we examined the influence of hydroseeding a commercial seed mixture on the revegetation of uranium mine wastes under a semi-arid Mediterranean climate in West-Central Spain. Eight dump slope sites differing two by two in revegetation treatment (hydroseeding or not) and aspect (north/south) were monitored annually during 3 years. There was a combined effect of treatment and aspect on the floristic composition during early succession. Particularly, hydroseeding increased differences in floristic composition between aspects, being the contribution of sown species to these differences small and short. Hydroseeding increased plant cover and diversity significantly only 2 years after its application on the north-facing slopes, favoured the perennial species (mainly hemicryptophytes), and had a different effect depending on the aspect favouring grasses and legumes on the north- and south-facing slopes, respectively. The species mixture was not suitable and the use of local seeds should be tested in future revegetation projects at this zone. The importance of improving natural colonisation for ecological restoration is emphasised.

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1. Introduction

The damage to soil and vegetation caused by mining, unless prevented by careful planning, is usually extreme, because the original ecosystems have had to be grossly disturbed or buried by the mining process (Bradshaw, 2000). To achieve a successful restoration the soil has to be remediated and the vegetation re-established (Bradshaw, 1997). The presence of an initial plant cover will clearly be important in beginning the process of stabilisation and accumulation of finer material (Bradshaw, 2000; Parrotta and Knowles, 2001; Nicolau, 2002).

However, in areas with a semi-arid Mediterranean climate, the low and irregular distribution of rainfall is the major factor limiting plant growth (Noy-Meir, 1973; Zohary, 1973) and vegetation cover tends to be low and sparse (Schelesinger et al., 1990).

To enhance vegetation establishment and stabilising inaccessible steep slopes, such as that caused by mining, the hydroseeding technique has become widely used (Sheldon and Bradshaw, 1977; Roberts and Bradshaw, 1985; Albadalejo et al., 2000; Brofas and Vareides, 2000). This involves spraying a homogeneous slurry of seed, fertilizer, binder and mulch

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