

# Abstract

Mining and construction industry is a major environmental disturbance creating habitats with extremely coarse material: gravel, cobbles and boulders. Simultaneously, there is an increasing interest in using spontaneous succession during restoration processes on those areas. This leads to a question if vegetation can establish on such coarse substrates. This project assessed the vegetation establishment on substrates with different grain size as well as the hydrological limitations of those substrates. The aim of this study was to find substrate moisture characteristics supporting vegetation establishment. Four herb species (*Koeleria macrantha*, *Epilobium angustifolium*, *Artemisia campestris* var. *campestris* and *Poa nemoralis*) typically occurring on xerothermic basalt rocks were sowed on basalt construction aggregates (0-4, 2-4, 4-8, 8-16, 11-22 and 32-63 mm). There were also made mixtures of coarse aggregates (4-8, 8-16 and 11-22 mm) as a base with 10% or 50% additive of fine aggregates (0-4 mm). The final number of individuals, aboveground and belowground dry biomass were measured and subsequently specific leaf area (SLA) was calculated. They were also measured substrate moisture characteristics: field capacity (PVK) and wilting point (BV) from which available water content (ODV) was obtained as well. Available water content was calculated as the difference between field capacity and wilting point. It was confirmed that successful vegetation establishment decreases with increasing substrate grain size. The significant biomass growth was observed for aggregates of 0-4 mm size. The volume of available water content for this grain size was approximately 8-9 %. Similarly, the 50% additive of this grain size to any coarse substrates led to a successful vegetation establishment. Surprisingly, the successful vegetation establishment depended on a percentage of fine aggregate additive rather than on grain size of the base. This knowledge can be taken as an advantage for restoration projects when there is no need to crush coarse substrates (4-22 mm) and use it for sites determined for vegetation establishment. It is sufficient to add fine aggregates (< 4 mm) in a volume to have approximately 50 % of this substrate available for plant roots.

**Keywords:** spontaneous succession, substrate water characteristics, construction aggregates, basalt