

Regulation mechanism of two planting methods on soil migration

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Abstract

In order to elucidate the regulatory effects of the two planting patterns on the soil migration of raindrops and runoff, the planting period and idle period of dry land with a single planting of *Prunella vulgaris* (traditional planting method) and *P. vulgaris* and earthworms (ecological planting method) were investigated through simulated rainfall experiments in the field. The results showed that: 1). The regulation effect of the two planting modes on soil migration indicators (raindrop separation rate, raindrop sediment transport rate, runoff separation rate, and runoff sediment transport rate) showed an overall decreasing trend with the increase of rainfall intensity or slope, which can be described by a binary function; 2). Compared with the planting mode of *Prunella vulgaris*, the regulation effect of raindrop sediment transport rate was significantly affected by rainfall intensity, and the regulation effect of raindrop separation rate, runoff separation rate and runoff sediment transport rate was significantly affected by slope under *Prunella vulgaris* combined with earthworm planting mode. The effects of rainfall intensity or slope on the regulation effects of runoff separation rate and runoff sediment transport rate are similar and the difference is not obvious; 3). Due to the special effect of earthworms on soil ecology, *Prunella vulgaris* combined with earthworms can improve the best impact index and inhibit soil migration in a short time, and the contribution rate is more than 45%. However, only planting *Prunella vulgaris* could not improve the soil properties in a short period of time, which also caused the influence index of *Prunella vulgaris* slope soil migration to be different from the regulation index of *Prunella vulgaris*.

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