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Effects of transported plant on soil physical properties

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Vegetation has long been recognized as an efficient way of preventing soil erosion. However, the effects of plants on gravity erosion are still broadly unknown. This study conducted a plant-root modelling experiment with the Pinus tabuliformis and Amorpha fruticosa under heavy rainfall on a micro-plot with a slope of 4° in the Wangdong Village, Shaanxi Province. The results showed that: (1) As the depth of the soil increases, the soil becomes more compacted and the influence of tree and shrub roots on soil consolidation ability increases. In the shallow soil with the depth of 20 cm , the maximum soil shear strength was 17 kpa and the maximum soil hardness was 21 N/cm^2 next to Pinus tabuliformis, while in the deep soil with the depth of 40 cm, the maximum soil shear strength was 22 kpa and the maximum soil hardness was 44 N/cm^2. In the shallow soil, the maximum soil shear strength was 16 kpa and the maximum soil hardness was 20 N/cm^2 next to Amorpha fruticosa, while in the deep soil the maximum soil shear strength was 19 kpa and the maximum soil hardness was 48 N/cm^2. (2) The differences of the root types make the plants differ in their soil consolidation abilities, for the tree root have a stronger consolidation ability than shrub roots. In the shallow soils, the soil water content next to Pinus tabuliformis was slightly lower than that of Amorpha fruticosa, while in deeper soils they were close to each other, so the soil cohesion next to Pinus tabuliformis was slightly higher than that of soil next to Amorpha fruticose. The maximum soil cohesion next to Pinus tabuliformis was 22 kpa and that of soil next to Amorpha fruticosa was 19 kpa. The maximum soil hardness next to Pinus tabuliformis was 44 N/cm^2 and that of soil next to Amorpha fruticosa was 48 N/cm^2.