

不同地面覆盖材料对壤土浑水径流入渗规律的影响

Effect of surface mulching materials on infiltration of muddy water on loamy soils

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中文摘要:

通过模拟覆盖、双环入渗试验,对两种土壤质地带新造人工林地、50%覆盖度条件下,地膜、渗水膜、干草、塑料泡膜4种地面覆盖材料对浑水入渗性能的影响及其机制进行了研究。结果表明,在浑水特性一定条件下,地面覆盖对浑水入渗性能的影响,既与土壤质地有关,又与覆盖材料的透水性和孔隙结构有关;4种地面覆盖材料,降低了土壤的入渗性能、延长了达到稳渗的历时。在常规地面覆盖栽培条件下,地面覆盖对积水型浑水入渗的削弱作用,在于覆盖材料改变了土壤表面的水动力特性,起着阻碍水分下渗的瓶颈作用。其中,尤以不透水的地膜最为明显,与对照相比,其稳渗率降幅达33%(轻壤土)~39%(中壤土);渗水膜和干草次之,塑料泡膜对下渗的削弱作用最小。覆盖对中壤土稳渗率及稳渗历时的影响大于轻壤土,稳渗历时延长60%~80%,但对累积入渗量的影响不及轻壤土。通过统计分析,得出了与覆盖材料性质和土壤质地有关的特征阻抗参数,为利用常规的浑水入渗资料推求覆盖条件下浑水入渗提供了可能。

英文摘要:

The test was carried out in Ansai and Chunhua experimental stations on the Loess Plateau in China. The tested soils were loess soil with a texture of light loam in Ansai and loam in Chunhua. The mulching materials include plastic film, water permeable plastic film, hay and sponge plastic sheet with 50% coverage on soil surface. The application of mulching materials generally decreased the infiltrability of muddy water into soil, and elonged the time required to reach the steady infiltration stage. The magnitude of reduction in infiltrability differed with mulching materials. Plastic film decreased infiltration most, followed by water permeable plastic film and hay, and sponged plastic sheet least. It appeared that the mulching materials changed the hydrodynamics characteristics of the infiltration surface, and acted as a 'bottle neck' to water infiltration. Moreover, soil texture had a significant effect on infiltration under mulching. The steady infiltration rate was 39% lower and the duration required to reach the steady infiltration stage was 60%~80% higher for mulching with plastic film than that for non-mulching control in the loam soil. In contrast, the impact of mulching on cumulative infiltration was greater in the light loam than in the loam soil. Characteristic impedance parameters relate to mulching materials and soil texture were put forward. These parameters provide a probability for calculating muddy water infiltration under partial mulching conditions from the data obtained under uncovered conditions.

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