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論文名稱: 土壤團粒化劑；團粒化作用；土壤流失量；發芽率；發芽勢

英文論文名稱: Polisoil；aggregation；soil loss；percentage germination；  
germination energy

### 【中文摘要】

在對於裸露的土壤進行大規模的植生噴植時，為配合施工常需拌入各式黏著劑，以防止或減低雨水與地表逕流對裸露表土的沖蝕作用，本試驗係探討由日本沖繩縣政府所研發推廣之防止裸露土壤沖蝕材料，探討其對於土壤之保育功效及其對種子發芽之影響。

本試驗的研究重點可分為兩個方面：首先，針對土壤團粒化劑對土壤理化性質的改變，進行土壤水分勢能測定、飽和水力傳導度試驗，以及團粒穩定濕篩分析等試驗；另一方面，則是對其應用上進行試驗，試驗內容包括室內人工模擬降雨沖蝕試驗、土壤團粒化劑入滲試驗以及胡枝子、百喜草等之種子發芽試驗等。

由土壤物理試驗結果顯示，加入土壤團粒化劑後的土壤其飽和水力傳導度（ $K_s$ ）為  $4.79 \times 10^{-2} \text{cm/s}$ ，約為未加入土壤團粒化劑之土樣的 22 倍，並可增大其孔隙，使其具有較穩定之團粒構造，且在低基質吸力（ $0 \sim 1 \text{bar}$ ）時，具有較佳的保水性。

由室內人工模擬降雨的結果，可知加入土壤團粒化劑後的裸露土壤，由於

表層土壤團粒化後，土壤的孔隙增加、細顆粒減少，除了可以增加水分的入滲外，更可減少逕流水中所挾帶泥沙量。且由種子發芽試驗結果顯示，植物種子會因加入土壤團粒化劑後，使得整體的發芽率降低且發芽勢亦有延後的情形。由於團粒的深度直接影響到土壤團粒化劑的抗沖蝕效果，故由入滲試驗結果可以知道在坡度越陡時，在坡面上方的團粒化劑入滲深度較下方坡面來的淺，此項結果可為在坡面施工時之參考。整體而言，在裸露表土使用土壤團粒化劑後，可使其在豪雨來臨前，快速而有效的在土壤表面形成一道保護膜，達到控制土壤流失的目的。

### 【英文摘要】

Proceeding the large-scale hydroseeding spraying to the nude soil, it needs to mix every kind of cohesive agents in order to under construction for the purpose of preventing or reducing rain and surface runoff from washing uncovered surface soil out. This experiment used the material which adopted by Okinawa county government to prevent or reduce the nude soil from water erosion. And the effect of the material on the soil protection and plant germination is discussed.

The study could be divided into two parts: first, concerning changing physical and chemical characteristics of soils, i proceed the tests of infiltration of water into soil, measurement of water potential, saturated hydraulic conductivity, and aggregate analysis by wet-sieving method; on the other side, i proceed the application tests of indoor artificial precipitation washout, polisoil infiltration, and germination.

Due to the effect of physical and chemical characteristics of soil, the soil reveals that its saturated hydraulic conductivity ( $K_s=4.79 \times 10^{-2} \text{cm/s}$ )

would be about 22 times, enlarge the pore and increase the stability of aggregates after adding the polisoil. Moreover, The soil has higher water holding capacity when the soil is wet.

The result of indoor artificial precipitation, suggesting that the nude soil

which adds the polisoil increase the infiltration, and reduce the runoff which carries the amount of silt owing to aggregation, increases the number of pore, and reduces the minute granular structure. However, the rate of the seed germination is lower and the germination energy is delayed. The penetrative depth of polisoil will affect the ability of erosion control. From the infiltration experiment results, we found the slope affects the infiltration depth. When the slope is steep, the infiltration depth is small. This results can be used as the reference during the construction. As to the whole situation, the nude soil with polisoil can form a protection quickly and efficiently to control the soil loss before the heavy rain.