

石塊敷蓋對紋溝間土壤沖蝕之影響

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摘 要 本文的主要目的在於探討石塊敷蓋率及敷蓋方式對紋溝間土壤沖蝕之影響機制。研究中採集臺北縣林口鄉的紅土，取通過 2mm 顆粒，重模於特別設計之試驗箱，並依序以人工降雨機模擬 40 mm·hr⁻¹ 及 60 mm·hr⁻¹ 降雨強度分別進行沖蝕試驗。試驗坡度固定為 20%。試驗之敷蓋率計有 0、0.1、0.2、0.3、0.45 及 0.6 共六種；敷蓋方式則有全部露出土壤表面及半嵌入土壤表面兩種。試驗結果發現，土壤表面的石塊，無論完全露出或半嵌入土壤表面，均具有降低紋溝間土壤沖蝕量之效果。其中又以石塊完全露出土壤表面之效果較佳，而且其原因除了因為石塊完全露出時之滲透性較佳以致逕流量相對較低之故外，本研究亦探討其他可能原因。此外，本研究建立了紋溝間土壤沖蝕率與石塊敷蓋率、降雨強度及石塊嵌入程度之關係式，其判定係數達到 0.82。

關鍵詞：土壤沖蝕、紋溝間、石塊、敷蓋率、敷蓋方式。

The Effects of Mulch of Rock Fragments on Interrill Soil Erosion

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ABSTRACT The main purpose of this study is to investigate the effects of the rates and types of rock fragments used as mulch on the mechanism of interrill soil erosion. The soil used in the soil erosion tests was the lateritic soil from Lin-Kou, Taipei County. After being sieved, soil particles finer than 2mm were collected and used for the tests. Rainfall simulations were repeated on the soil samples at rainfall intensities of 40 and 60 mm·hr⁻¹ continuously. Erosion pans and the rainfall simulator were specially designed and fabricated for this study. During the tests, the slope steepness of the erosion pans was kept at 20%. The erosion tests were repeated on soil samples at the mulch rates of 0, 0.1, 0.2, 0.3, 0.45 and 0.6, and on soil samples with the mulch of rock fragments completely exposed on the existing soil surface and half embedded into the soil (i.e. the embedded ratios were 0 and 50%). It

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was found no matter the rock fragments were exposed on the existing soil surface or half embedded into the soil, they could effectively reduce the quantity of interrill soil erosion. However, rock fragments exposed on the existing soil surface were found better for reducing interrill erosion. Aside from that the runoff rate of rock fragments exposed on the existing soil surface may be less than those half embedded because of more infiltration, and other possible reasons for this are also investigated in this study. Besides, statistical equations for estimating interrill soil erosion rate from the parameters of mulch rate, rainfall intensity and embedding level were established with good correlations ($R^2=0.82$).

Key Words: soil erosion, interrill, rock fragment, mulch rate, mulch type.