

Intisari

Batu apung merupakan bahan yang bersifat ringan dan porous. Batu apung halus telah banyak digunakan sebagai bahan konstruksi bangunan dan filter pembersih air. Namun, batu apung belum banyak diteliti sebagai bahan pembenah tanah untuk kegiatan konservasi mengendalikan laju erosi. Penelitian terkait pengendalian erosi sebelumnya menggunakan dosis batu apung 10 ton/ha yang diaplikasikan pada plot erosi namun belum meneliti efek dosis batu apung yang lebih tinggi. Tujuan penelitian ini untuk mengkaji efektivitas batu apung dengan dosis yang lebih tinggi untuk mengendalikan laju erosi.

Pengamatan dan pengukuran limpasan air permukaan dan erosi dilakukan pada puncak-akhir musim penghujan Bulan Februari-Maret 2022. Penelitian dilakukan dengan menggunakan empat plot erosi dengan perlakuan kontrol, aplikasi batu apung 10 ton/ha, 15 ton/ha, dan 20 ton/ha. Limpasan permukaan diukur dengan volume air dalam drum penampung yang terhubung dengan plot erosi dan sampel sedimen erosi diambil dari sedimen melayang dalam drum penampung. Sampel tanah terusik dan bongkah tiap plot digunakan untuk analisis laboratorium karakteristik kadar lengas, BV, BJ, pF, bahan organik, dan stabilitas agregat. Dalam plot diaplikasikan pula mikoriza arbuskular untuk meningkatkan kesuburan tanah dan jagung sebagai indikator kesuburan tanah. Analisis regresi linear digunakan untuk menganalisis keeratan curah hujan dengan limpasan permukaan dan erosi.

Hasil penelitian menunjukkan bahwa aplikasi batu apung menurunkan limpasan permukaan 18-44% dan sedimentasi tanah turun 39-61% berkorelasi negatif dengan peningkatan dosis batu apung. Aplikasi batu apung dosis 20 ton/ha menurunkan volume limpasan dan erosi tanah lebih besar dibandingkan dosis 10 dan 15 ton/ha. Batu apung memiliki BV rendah dan porositas >60%. Aplikasi batu apung menurunkan BV dan BJ tanah yang meningkatkan porositas tanah. Porositas tanah plot 20 ton/ha lebih tinggi dibandingkan plot 10 dan 15 ton/ha. Peningkatan porositas tanah mampu meningkatkan infiltrasi air sehingga limpasan permukaan berkurang. Dosis batu apung yang lebih tinggi memperbaiki stabilitas agregat tanah menjadi lebih mantap yang meningkatkan ketahanan tanah terhadap erosi.

Kata kunci: Batu apung, Erosi, Limpasan Permukaan, Sedimen

Abstract

Scoria is a light and porous material. Fine scoria has been widely used as a building construction material and water purification filter. However, scoria stone has not been widely studied as a soil improvement material for conservation activities to control the rate of erosion. Previous studies related to erosion control used a scoria dose of 10 tons/ha which was applied to erosion plots but had not investigated the effect of a higher scoria dose. The purpose of this study is to examine the effectiveness of scoria with a higher dose to control erosion rate.

Observations and measurements of surface runoff and erosion were carried out at the peak-end of the rainy season in February-March 2022. The study was carried out using four erosion plots with control treatment, scoria application of 10 tons/Ha, 15 tons/Ha, and 20 tons/Ha. Surface runoff is measured by the volume of water in the collection drum connected to the erosion plot and erosion sediment samples are taken from the floating sediment in the collection drum. Disturbed soil samples and lumps of each plot were used for laboratory analysis of the characteristics of moisture content, BV, BJ, pF, organic matter, and aggregate stability. In the plot, arbuscular mycorrhizal fungi were also applied to increase soil fertility and maize as an indicator of soil fertility. Linear regression analysis was used to analyze the closeness of rainfall to surface runoff and erosion.

The results showed that scoria application decreased surface runoff by 18-44% and soil sedimentation decreased by 39-61% negatively correlated with increasing scoria dose. The application of scoria at a dose of 20 tons/ha reduced the volume of runoff and soil erosion more than the doses of 10 and 15 tons/ha. Scoria has a low BV and >60% porosity. The application of scoria reduces the BV and BJ of the soil which increases the porosity of the soil. The soil porosity of plots of 20 tons/Ha was higher than those of plots of 10 and 15 tons/Ha. Increasing soil porosity can increase water infiltration so that surface runoff is reduced. A higher dose of scoria improves soil aggregate to stability become more stable which increases the soil's resistance to erosion.

Keywords: Scoria, Erosion, Surface Runoff, Sediment