

## RINGKASAN

Erosi merupakan perpindahan material tanah dari satu tempat ke tempat yang lain oleh media tertentu, seperti air, angin dan lain sebagainya. Penggunaan sistem guludan vertikal terbukti rentan terhadap erosi yang dapat menyebabkan degradasi lahan dan pencemaran lingkungan. Sistem guludan vertikal jika diaplikasikan bersama dengan mulsa dan bioarang berpotensi dapat menurunkan laju erosi dan memperbaiki sifat fisik tanah, namun hal tersebut belum banyak didokumentasikan secara rinci. Penelitian ini mengkaji pengaruh sistem guludan vertikal dengan aplikasi bioarang dan variasi jenis mulsa terhadap laju *run off*, perkolasi, kehilangan tanah, serta sifat fisik dan dinamika (neraca) air tanah pada percobaan skala laboratorium dengan bantuan rainfall simulator.

Penelitian dilakukan di Bengkel Teknologi Pertanian, sedangkan analisis laboratorium dilakukan di Laboratorium Teknologi Pertanian, Fakultas Pertanian, Universitas Jenderal Soedirman. Penelitian dilaksanakan pada bulan Mei sampai September 2015. Penelitian ini menggunakan bak percobaan seluas 1 m x 1 m dengan sistem guludan vertikal untuk 3 perlakuan, yaitu tanpa mulsa (TM), mulsa plastik (MP), dan mulsa jerami (MJ). Pengukuran aliran *run off* dan perkolasi diukur setiap 5 menit selama 2 jam percobaan, sedangkan pengukuran sifat fisik tanah (kadar air, kepadatan, permeabilitas) dilakukan dalam 2 tahap, yaitu sebelum dan sesudah hujan.

Hasil penelitian menunjukkan bahwa pemberian mulsa plastik (MP) dan mulsa jerami (MJ) pada sistem guludan vertikal dapat menurunkan laju *run off* (MP: 26,28%, MJ: 21,5%), kehilangan tanah (MP: 72,2%, MJ: 68,2%), perkolasi (MP: 14,09%, MJ: 7,28%), kepadatan tanah (MP: 13,9%, MJ: 7,72%), serta menaikkan permeabilitas tanah (MP: 19,66%, MJ: 7,97%) dibanding perlakuan tanpa mulsa (TM). Presentase nilai output kompartemen pada perlakuan tanpa mulsa (TM) sebesar 42,6% *run off*, 48,8% perkolasi, dan 8,6% kadar air tanah, pada perlakuan mulsa plastik (MP) sebesar 30,18% *run off*, 63,3% perkolasi, dan 6,8% kadar air, pada perlakuan mulsa jerami (MJ) sebesar 33,7% *run off*, 58,2% perkolasi, dan 8,1% kadar air tanah. Penggunaan mulsa plastik pada sistem guludan vertikal lebih efektif meminimalisir laju erosi dan menjaga sifat fisik tanah dibandingkan mulsa jerami dan tanpa mulsa.

## SUMMARY

*Erosion is a displacement of soil from one place to another by certain media, such as water, wind and others. The use of vertical ridges system is proved to be vulnerable to erosion, which in turn caused land degradation and environmental pollution. Vertical ridges system, when is applied together with mulch and biochar, potent to reduce erosion and improve soil physical properties , but this matter has not been widely documented in detail. This study examined the effect of vertical ridges systems with application of biochar and various types of mulches on the rate of run-off, percolation, soil loss and soil physical properties and water dynamics in a laboratory scale experiment with the help of rainfall simulator.*

*Research was carried out in the Agriculture Technology laboratory, while the sample analysis was conducted in the Agriculture Technology laboratory, Faculty of Agriculture, Jenderal Soedirman University from May to September 2015. This research used an experimental box of 1 m x 1 m large with vertical ridges system for 3 treatments, namely without mulch (TM), plastic mulch (MP), and rice-straw mulch (MJ). Measurement of run-off and percolation flow were conducted every 5 minutes during the 2-hour experiment, while measurements of the physical properties of the soil (moisture content, density, permeability) were performed in two stages ie, before and after rainfall event.*

*The results showed that the plastic (MP) and rice-straw mulching (MJ) on the vertical ridges system could reduce the rate of run-off (MP: 26,28%, MJ: 21,5%), soil loss (MP: 72,2% MJ: 68,2%), percolation (MP: 14,09%, MJ: 7,28%), the density of the soil (MP: 13,9%, MJ: 7,72%), and increased soil permeability (MP: 19,66%, MJ: 7,97%) as compared to without mulching treatment (TM). Percentage value of output compartments without mulching treatment (TM) was 42,6% run off, percolation 48,8%, and 8,6% water content, that with the plastic mulch treatments (MP) was 30,18% run off, 63,3% percolation, and 6,8% water content, and that with the rice-straw mulch treatment (MJ) was 33,7% run off, percolation 58,2%, and 8,1% water content. The use of plastic mulch on vertical ridges system tended to be more effective to minimize erosion and to maintain soil physical properties compared to straw mulch and without mulch.*