

HUBUNGAN SIFAT-SIFAT FISIKA TANAH, LAJU INFILTRASI, DAN PERMEABILITAS TANAH PADA BEBERAPA PENGGUNAAN LAHAN DAN KELAS LERENG DI LAHAN KARST PACAREJO, SEMANU, GUNUNGKIDUL

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ABSTRAK

Lahan karst di Kalurahan Pacarejo, Semanu, Gunungkidul memiliki kelerengan datar hingga curam dan penggunaan lahan berbeda seperti kebun dan tegalan yang memungkinkan terjadinya perbedaan sifat fisik tanah. Penelitian ini bertujuan untuk mengetahui laju infiltrasi dan permeabilitas tanah serta hubungannya dengan sifat-sifat fisik tanah pada beberapa penggunaan lahan dan kelas lereng khususnya di lahan UPN “Veteran” Yogyakarta Semanu, Gunungkidul. Penelitian ini dilakukan dengan metode survey dan analisis laboratorium. Penentuan titik sampel secara *purposive sampling* berdasarkan peta sistem lahan hasil *overlay* peta kemiringan lereng dan penggunaan lahan meliputi 12 titik sampel. Hasil penelitian menunjukkan bahwa laju infiltrasi dan permeabilitas didominasi oleh harkat sedang kecuali di lahan terbuka dengan harkat agak lambat. Laju infiltrasi terendah pada penggunaan lahan terbuka dengan lereng landai (8-15%) yaitu 1,96 cm/jam (agak lambat) dan tertinggi pada penggunaan lahan pohon jati dengan lereng landai yaitu 6,26 cm/jam (sedang). Laju permeabilitas terendah pada penggunaan lahan terbuka dengan lereng landai yaitu 1,97 cm/jam (agak lambat) dan tertinggi pada penggunaan lahan semak belukar dengan lereng datar (0-8%) yaitu 4,74 cm/jam (sedang). Sifat fisik tanah didominasi tekstur lempung, struktur gumpal membulat, porositas kurang baik, dan pori makro. Laju infiltrasi berkorelasi kuat dengan berat volume tanah ($r = -0,612$) dan berat jenis tanah ($r = -0,666$). Permeabilitas berkorelasi kuat dengan porositas ($r = 0,613$), berat volume tanah ($r = -0,623$), dan pori makro tanah ($r = 0,724$).

Kata kunci: infiltrasi, permeabilitas tanah, sifat fisika tanah, karst

**RELATIONSHIP BETWEEN SOIL PHYSICAL PROPERTIES,
INFILTRATION RATE, AND SOIL PERMEABILITY ON SEVERAL
LAND USE TYPES AND SLOPE CLASSES IN KARST AT PACAREJO,
SEMANU, GUNUNGKIDUL**

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ABSTRACT

The karst land in Kalurahan Pacarejo, Semanu, Gunungkidul has slopes ranging from flat to steep and different land uses such as gardens and dry fields, which may result in variations in soil physical properties. This study aims to determine the soil infiltration rate and permeability, as well as their relationship with soil physical properties across different land uses and slope classes, specifically at the UPN “Veteran” Yogyakarta land in Semanu, Gunungkidul. The study was conducted using survey methods and laboratory analysis. Sampling points were determined using purposive sampling based on land system maps obtained from an overlay of slope and land use maps, totaling 12 sampling points. The results showed that the infiltration and permeability rates were generally moderate, except for open land, which showed a slightly slow rate. The lowest infiltration rate was observed in open land with gentle slopes (8–15%) at 1.96 cm/hour (slightly slow), while the highest infiltration rate occurred in teak tree land with gentle slopes at 6.26 cm/hour (moderate). The lowest permeability was found in open land with gentle slopes at 1.97 cm/hour (slightly slow), and the highest permeability was found in shrub land with flat slopes (0–8%) at 4.74 cm/hour (moderate). The soil physical properties were dominated by clay texture, rounded granular structure, poor porosity, and macropores. The infiltration rate showed a strong negative correlation with bulk density ($r = -0.612$) and soil particle density ($r = -0.666$). Permeability was strongly correlated with porosity ($r = 0.613$), bulk density ($r = -0.623$), and macropores ($r = 0.724$).

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Keywords: infiltration, soil permeability, soil physical properties, karst