

**KARAKTERISASI KEMBANG DAN KERUT TANAH AQUERTS DAN
USTERTS DI KAPANEWON PALIYAN, KABUPATEN GUNUNGKIDUL,
DAERAH ISTIMEWA YOGYAKARTA**

**Oleh: Rizkia Annisa Putri Azmar
Dibimbing oleh: Mohammad Nurcholis**

ABSTRAK

Tanah Aquerts dan Usterts merupakan subordo Vertisol yang dicirikan oleh sifat kembang–kerut, yang berpengaruh terhadap stabilitas lahan serta kemampuan akar dalam menyerap air dan unsur hara. Penelitian ini bertujuan untuk mengkarakterisasi perilaku kembang dan kerut tanah Aquerts dan Usterts di Kapanewon Paliyan, Kabupaten Gunungkidul, Daerah Istimewa Yogyakarta. Analisis dilakukan terhadap sifat fisik dan kimia tanah, meliputi tekstur, kadar lengas tanah kering angin, kadar lengas maksimum, pH, bahan organik tanah (BOT), kapasitas penukar kation (KPK), serta kation basa terekstrak DTPA (Ca^{2+} , Mg^{2+} , K^{+} , dan Na^{+}). Kembang tanah dianalisis menggunakan Free Swell Index (FSI), sedangkan kerut tanah menggunakan Coefficient of Linear Extensibility (COLE). Hubungan antara sifat tanah dengan kembang–kerut dianalisis secara deskriptif berdasarkan garis tren linier. Hasil menunjukkan bahwa Aquerts memiliki nilai FSI sebesar 48,79 yang tergolong dalam kelas kembang tanah tinggi, sedangkan Usterts memiliki FSI sebesar 67,48 dengan kelas kembang sangat tinggi. Tingginya kembang kedua tanah terutama dipengaruhi oleh tingginya kadar lempung akibat luas permukaan spesifik yang besar dalam mengadsorpsi air. Pada Aquerts, kembang tanah menurun seiring meningkatnya kadar lengas tanah kering angin dan BOT, sedangkan pada Usterts kembang tanah berbanding terbalik dengan pH. Nilai COLE pada Aquerts sebesar 0,18 dan pada Usterts sebesar 0,22, yang keduanya tergolong dalam kelas kerut sangat tinggi. Pada Aquerts, kadar lempung berhubungan berbanding lurus dengan COLE dan BOT menekan tingkat pengerutan, sedangkan pada Usterts, kadar lengas maksimum meningkatkan kerut tanah.

Kata kunci: Free Swelling Test, COLE, Lempung Montmorilonit, Vertisol

**CHARACTERIZATION OF SWEEL AND SHRINK OF AQUERTS AND
USTERTS IN KAPANEWON PALIYAN, GUNUNGKIDUL REGENCY,
SPECIAL REGION OF YOGYAKARTA**

**By: Rizkia Annisa Putri Azmar
Supervised by: Mohammad Nurcholis**

ABSTRACT

Aquerts and Usterts are Vertisol suborders characterized by shrink–swell behavior, which affects land stability and plant root capacity to absorb water and nutrients. This study aimed to characterize the swelling and shrinkage behavior of Aquerts and Usterts in Kapanewon Paliyan, Gunungkidul Regency, Special Region of Yogyakarta. Soil physical and chemical properties were analyzed, including texture, air-dry soil moisture, maximum soil moisture, pH, soil organic matter (SOM), cation exchange capacity (CEC), and DTPA-extractable base cations (Ca^{2+} , Mg^{2+} , K^{+} , and Na^{+}). Soil swelling was evaluated using the Free Swell Index (FSI), while soil shrinkage was assessed using the Coefficient of Linear Extensibility (COLE). Relationships between soil properties and swelling–shrinkage behavior were analyzed descriptively based on linear trend lines. The results indicated that Aquerts exhibited an FSI value of 48.79, classified as high swelling potential, whereas Usterts showed an FSI value of 67.48, corresponding to very high swelling potential. The pronounced swelling of both soils was mainly governed by high clay contents due to their large specific surface area for water adsorption. In Aquerts, swelling decreased with increasing air-dry soil moisture and SOM, while in Usterts, swelling was negatively associated with soil pH. The COLE values were 0.18 for Aquerts and 0.22 for Usterts, both categorized as very high shrinkage potential. In Aquerts, clay content was positively related to COLE and SOM mitigated shrinkage, whereas in Usterts, maximum soil moisture enhanced soil shrinkage.

Key words: Free Swelling Test, COLE, Montmorillonite Clay, Vertisol