

ABSTRAK

KEANEKARAGAMAN FAUNA TANAH DAN PERAN CACING TANAH DALAM PEMBENTUKAN AGREGAT TANAH DAN KANDUNGAN AIR TANAH DI HUTAN TEMPERAT DINGIN, PREFECTURE KOCHI, JEPANG

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Hutan mendukung sebagian besar keanekaragaman hayati daratan, dengan fauna tanah, khususnya cacing tanah, berperan penting dalam meningkatkan struktur tanah dan mengatur retensi air. Penelitian ini mengkaji hubungan antara keanekaragaman fauna tanah dan distribusi agregat tanah, serasah, serta akar pada lapisan atas tanah di Hutan Tosashimizu, Prefecture Kochi, Jepang. Pengambilan sampel lapangan dilakukan di area datar dan dengan kemiringan sedang, diikuti eksperimen laboratorium menggunakan cacing tanah epigeik dalam kondisi simulasi endogeik. Agregat tanah diklasifikasikan menjadi fraksi halus (<2 mm), mikro (2–4 mm), dan makro (>4 mm). Perubahan ukuran partikel dan kandungan air tanah diamati setiap bulan selama empat bulan. Hasil penelitian menunjukkan kelimpahan fauna tanah yang secara signifikan lebih tinggi pada area datar. Aktivitas cacing tanah epigeik meningkatkan pembentukan agregat yang lebih besar dan memperbaiki retensi air, terutama pada kelas agregat halus dan mikro. Analisis statistik menunjukkan bahwa meskipun aktivitas cacing tanah secara signifikan memengaruhi sifat fisik tanah, biomassa individu bukanlah faktor penentu. Temuan ini menyoroti kapasitas rekayasa ekologi cacing tanah epigeik, yang tersebar luas di berbagai ekosistem, serta potensinya dalam meningkatkan ketahanan tanah dan pengaturan air. Penelitian ini memberikan wawasan berharga untuk pengelolaan hutan berkelanjutan dan praktik pertanian di tengah perubahan kondisi lingkungan.

Kata Kunci: Keanekaragaman Hayati Tanah, Agregat Tanah, Air tanah, Hutan Tosashimizu, Cacing Tanah, Spesies Epigeik

ABSTRACT

BIODIVERSITY OF SOIL FAUNA AND THE ROLE OF EARTHWORMS IN SOIL AGGREGATE FORMATION AND SOIL WATER CONTENT IN WARM TEMPERATE FOREST KOCHI PREFECTURE, JAPAN

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Forests support the majority of terrestrial biodiversity, with soil fauna, particularly earthworms, playing a critical role in enhancing soil structure and regulating water retention. This study investigates the relationship between soil faunal biodiversity and the distribution of soil aggregates, litter, and roots in the topsoil layer of Tosashimizu Forest, Kochi Prefecture, Japan. Field sampling was conducted in flat and moderately sloped areas, followed by laboratory experiments using epigeic earthworms under simulated endogeic conditions. Soil aggregates were classified into fine (<2 mm), micro (2–4 mm), and macro (>4 mm) fractions. Changes in particle size and soil water were observed monthly over a four-month period. Results indicated significantly higher soil fauna abundance in flat areas. The activity of epigeic earthworms enhanced the formation of larger aggregates and improved water retention, especially in fine and micro-aggregate classes. Statistical analyses showed that while earthworms activity significantly influenced soil physical properties, individual biomass was not a determining factor. These findings highlight the ecological engineering capacity of epigeic earthworms, widely available across ecosystems, and their potential to improve soil resilience and water regulation. This study contributes valuable insights for sustainable forest management and agricultural practices under changing environmental conditions.

Keywords: Soil biodiversity, Soil aggregates, Soil Water, Tosashimizu Forest, Earthworms, Epigeic species