

**THE DIVERSITY OF NEMATODES IN INTENSIVE AND NON-INTENSIVE CACAO PLANTING SYSTEM (*Theobroma cacao* L.) IN GUNUNG KIDUL REGENCY, SPECIAL REGION OF YOGYAKARTA**

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**ABSTRACT**

Cacao (*Theobroma cacao* L.) is an important plantation crop widely cultivated in tropical regions, including Indonesia. Differences in management practices between intensive and non-intensive cacao planting systems may influence soil ecological conditions, particularly the structure of nematode communities. Nematodes play dual roles as plant-parasitic organisms that can reduce crop productivity and as beneficial organisms that function as indicators of soil health. This study aimed to inventory and characterize nematodes and to analyze differences in population density, diversity, and dominance between intensive and non-intensive cacao planting systems in Gunung Kidul Regency, Special Region of Yogyakarta. The study was conducted using a survey method with random soil sampling from intensive and non-intensive cacao fields. Soil samples were collected from 9 cacao trees in each system, homogenized, and arranged into 3 replicates. Nematodes were extracted using the Whitehead Tray method and identified based on morphological and morphometric characteristics. Population density, diversity index, frequency, and dominance were calculated differences between systems. The results showed that 3 nematode genera were identified, namely *Rhabditis* sp., *Pratylenchus* sp., and *Plectus* sp. Nematode population density was significantly higher in the non-intensive cacao planting system compared to the intensive system. *Rhabditis* sp. dominated both systems, while *Pratylenchus* sp. and *Plectus* sp. were present at low densities and showed no significant differences between systems. The diversity index in both planting systems was low, indicating dominance by a limited number of genera. These findings indicate that cacao planting system management influences nematode community structure, particularly population density and dominance patterns, with non-intensive systems supporting higher nematode abundance.

Keywords: Exploration, Plant parasitic nematodes, Sustainable agriculture, Bioindicator, Agroecosystem.

**KERAGAMAN NEMATODA PADA SISTEM PENANAMAN KAKAO  
INTENSIF DAN NON-INTENSIF (*Theobroma cacao* L.) DI KABUPATEN  
GUNUNG KIDUL, DAERAH KHUSUS YOGYAKARTA**

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**ABSTRAK**

Kakao (*Theobroma cacao* L.) merupakan tanaman perkebunan penting yang banyak ditanam di daerah tropis, termasuk Indonesia. Perbedaan praktik pengelolaan antara sistem pertanian kakao intensif dan non-intensif dapat mempengaruhi kondisi ekologi tanah, khususnya struktur komunitas nematoda. Nematoda memiliki peran ganda sebagai organisme parasit tumbuhan yang dapat mengurangi produktivitas tanaman dan sebagai organisme bermanfaat yang berfungsi sebagai indikator kesehatan tanah. Studi ini bertujuan untuk mendata dan mengkarakterisasi nematoda serta menganalisis perbedaan densitas populasi, keragaman, dan dominasi antara sistem pertanian kakao intensif dan non-intensif di Kabupaten Gunung Kidul, Daerah Istimewa Yogyakarta. Studi ini dilakukan dengan metode survei menggunakan pengambilan sampel tanah secara acak dari kebun kakao intensif dan non-intensif. Sampel tanah dikumpulkan dari 9 pohon kakao di setiap sistem, dihomogenisasi, dan disusun menjadi 3 replikasi. Nematoda diekstraksi menggunakan metode Whitehead Tray dan diidentifikasi berdasarkan karakteristik morfologis dan morfometrik. Kepadatan populasi, indeks keragaman, frekuensi, dan dominansi dihitung, dan perbedaan antara sistem dianalisis menggunakan uji t dua sampel. Hasil menunjukkan bahwa 3 genus nematoda teridentifikasi, yaitu *Rhabditis* sp., *Pratylenchus* sp., dan *Plectus* sp. Kepadatan populasi nematoda secara signifikan lebih tinggi pada sistem pertanian kakao non-intensif dibandingkan dengan sistem intensif. *Rhabditis* sp. mendominasi kedua sistem, sementara *Pratylenchus* sp. dan *Plectus* sp. terdapat dalam kepadatan rendah dan tidak menunjukkan perbedaan signifikan antara sistem. Indeks keragaman di kedua sistem pertanian rendah, menunjukkan dominasi oleh sejumlah genus yang terbatas. Temuan ini menunjukkan bahwa pengelolaan sistem pertanian kakao mempengaruhi struktur komunitas nematoda, terutama kepadatan populasi dan pola dominasi, dengan sistem non-intensif mendukung kepadatan nematoda yang lebih tinggi.

Kata kunci: Eksplorasi, Nematoda parasit tumbuhan, Pertanian berkelanjutan, Bioindikator, Agroekosistem.