

STRUKTUR KOMUNITAS MAKROFAUNA TANAH SEBAGAI BIOINDIKATOR KUALITAS TANAH DI LAHAN PERKEBUNAN KAWASAN PENYANGGA DAN HUTAN ALAMI, TAMAN NASIONAL GUNUNG CIREMAI

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ABSTRAK

Makrofauna dapat digunakan menjadi bioindikator kualitas tanah karena sensitif terhadap gangguan yang disebabkan oleh aktivitas manusia. Pertanian dan perkebunan banyak menggunakan bahan anorganik yang dapat mengganggu eksistensi komunitas fauna tanah. Taman Nasional Gunung Ciremai (TNGC) saat ini sedang menginisiasi pertanian organik sebagai langkah penggantian pertanian anorganik di kawasan penyangga agar menjaga kelestarian lingkungan. Tujuan penelitian ini yaitu mengetahui perbedaan struktur komunitas makrofauna tanah di lahan organik, anorganik dan hutan alami TNGC serta kaitannya dengan kualitas tanah. Pengambilan sampel dilakukan di Demplot Pertanian Organik dan Anorganik kawasan Penyangga TNGC dan Hutan Alami pada bulan Maret 2022. Pengambilan sampel dilakukan dengan metode *pitfall traps* dan *hand sorting* pada tiga tempat dan pengulangan dilakukan sebanyak tiga kali. Faktor abiotik yang diukur yaitu intensitas cahaya, kelembapan tanah, suhu tanah, kelembapan udara, suhu udara, pH tanah dan kandungan C-Organik tanah. Data yang didapat dianalisis dengan menghitung indeks keanekaragaman, indeks similaritas, indeks kekayaan, indeks pemerataan, indeks dominansi dan uji korelasi. Secara total didapatkan 489 individu makrofauna yang terbagi kedalam 6 kelas, 13 ordo dan 42 morfospesies. Indeks keanekaragaman tertinggi berada di Demplot Pertanian Organik (2,47), kemudian pada lahan Anorganik (2,45) dan pada Kawasan Hutan Alami (2,15). Suhu tanah dan suhu udara memiliki korelasi kuat dan positif dengan indeks kekayaan ($r = ,999^*$), sedangkan PH tanah memiliki korelasi kuat dan negatif dengan indeks keanekaragaman ($r = -,1000$). Demplot Pertanian Organik dan Hutan Alami berpotensi memiliki kondisi tanah yang paling baik diantara ketiga lokasi, karena berdasarkan makrofauana tanah yang dijadikan bioindikator, kedua lokasi tersebut didapatkan 3 jenis makrofauna.

Kata Kunci: faktor abiotik, kelimpahan, *pitfall traps*, *hand sorting*, korelasi.

COMMUNITY STRUCTURE OF SOIL MACROFAUNA AS A BIOINDICATOR OF SOIL QUALITY IN PLANTATION LAND AN AREA AND NATURAL FOREST, MOUNT CIREMAI NATIONAL PARK

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ABSTRACT

Macrofauna can be used as bioindicators of soil quality because they are sensitive to disturbances caused by human activities. Agriculture and plantations use a lot of inorganic materials that can interfere with the existence of soil fauna communities. Mount Ciremai National Park (TNGC) is currently initiating organic farming as a step to replace inorganic agriculture in the buffer zone in order to preserve the environment. The purpose of this study was to determine differences in the structure of soil macrofauna communities in organic, inorganic and natural forests of TNGC and their relation to soil quality. Sampling was carried out at the Organic and Inorganic Agriculture demonstration plot in the TNGC Buffer area and Natural Forest in March 2022. Sampling was carried out using pitfall traps and hand sorting methods in three places and repeated three times. The abiotic factors measured were light intensity, soil moisture, soil temperature, air humidity, air temperature, soil pH and soil C-Organic content. The data obtained were analyzed by calculating the diversity index, similarity index, wealth index, evenness index, dominance index and correlation test. In total, there were 489 macrofauna individuals divided into 6 classes, 13 orders and 42 morphospecies. The highest diversity index was in the Organic Agriculture Demonstration Plan (2.47), then in inorganic land (2.45) and in the Natural Forest Area (2.15). Soil temperature and air temperature had a strong and positive correlation with the richness index ($r = .999^*$), while soil pH had a strong and negative correlation with the diversity index ($r = -.1000$). The organic agriculture and natural forest demonstration plots have the potential to have the best soil conditions among the three locations, because based on the soil macrofauna used as bioindicators, the two locations obtained 3 types of macrofauna.

Keywords: abiotic factors, abundance, pitfall traps, hand sorting, correlation.