ARTHROPODA TANAH SEBAGAI BIOINDIKATOR KESEHATAN EKOSISTEM HUTAN PADA TIGA TIPE LAHAN YANG BERBEDA

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INTISARI

Arthropoda tanah merupakan kelompok organisme yang efektif digunakan sebagai bioindikator. Informasi terkait kelimpahan dan keanekaragaman arthropoda tanah dapat digunakan untuk menggambarkan kesehatan ekosistem hutan. Berbagai karakter tipe lahan seperti keragaman vegetasi dan intensitas pengelolaan lahan dapat berpengaruh terhadap populasi arthropoda tanah. Penelitian ini bertujuan untuk mengetahui respon arthropoda tanah terhadap tiga tipe lahan dengan karakteristik yang berbeda di area Hutan Pendidikan Wanagama I, Gunungkidul, Yogyakarta.

Penelitian dilakukan selama 3 bulan di tipe lahan Agroforestri (AF/intensitas kelola aktif), Hutan Campur (HC/intensitas kelola semi-aktif), dan Pionir (PN/intensitas kelola non aktif). Pengambilan data lapangan dilakukan dengan menggunakan petak pengamatan berukuran 20x20 m^2 yang diletakkan secara *purposive*. Koleksi arthropoda tanah diperoleh dengan menggunakan metode *handsorting*, *pitfall trap*, dan Berlese-Tullgrenn *funnel*. Pengukuran kondisi lingkungan meliputi suhu udara, suhu tanah, kelembaban tanah, intensitas cahaya, pH tanah, dan ketebalan seresah.

Hasil penelitian menunjukkan kelimpahan arthropoda tanah tertinggi pada tipe lahan PN, diikuti oleh HC dan AF. Indeks keanekaragaman (H') Shannon-Wiener menunjukkan bahwa keanekaragaman arthropoda tanah di tipe lahan HC dan AF termasuk kategori tinggi (3,61 dan 3,03), sedangkan keanekaragaman arthropoda tanah di PN termasuk kategori rendah (0,39). Faktor tipe lahan dan bulan pengamatan memberikan pengaruh yang berbeda terhadap kelimpahan taksa dominan (Collembola, Formicidae, Acarina, Araneae, Coleoptera, Gryllidae, dan Termitidae). Collembola dan Coleoptera menunjukkan hubungan yang lebih erat dengan faktor abiotik, khususnya kelembaban dibandingkan faktor lingkungan lain. Melalui penelitian ini, ekosistem Hutan Pendidikan Wanagama I masih dapat dinyatakan sebagai ekosistem yang sehat ditinjau dari tingginya keanekaragaman dan kelimpahan bioindikator pada tiga tipe lahan yang diamati. Namun demikian, evaluasi dampak pemanfaatan lahan dalam jangka panjang terhadap keberadaan dan keanekaragaman arthropoda tanah perlu dilakukan.

Kata kunci: arthropoda tanah, tipe lahan, bioindikator, pionir

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SOIL ARTHROPOD AS BIOINDICATOR OF FOREST HEALTH ECOSYSTEM IN THREE DIFFERENT LAND TYPES

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ABSTRACT

Soil arthropods represent as a group of organisms which effetively used as bioindicators. Information regarding their abundance and diversity can be used to describe of ecosystem health. Various land type characters such as vegetation diversity and intensity of land management affect soil arthropod populations. This study aims to determine how soil arthropods response to three land with different characteristics in Wanagama Education and Research Forest (ERF) I, Gunungkidul, Yogyakarta.

The research was conducted for 3 months in Agroforestry (AF/intensive land management), Mixed Forest (HC/medium-intensity land management), and Pioneer (PN/land without management). Field data was carried out using observation plots of 20x20 m^2 placed in purposively. Handsorting, pitfall traps and Berlese-Tullgrenn method were used to collect the soil arthropods. The abiotic factors measured were air temperature, soil temperature, humidity, light intensity, soil pH, and litter thickness.

The result showed that the highest abundance of soil arthropods was in PN, followed by HC and AF. The Shannon-Wiener diversity (H') indices shows HC and AF have high diversity of soil arthropods (3,61 and 3,03), while PN has a low diversity (0,39). The land type and month in this study have a different effect on the abundance of dominant taxa (Collembola, Formicidae, Acarina, Araneae, Coleoptera, Gryllidae, and Termitidae). Collembola and Coleoptera show a strong relationship with abiotic factor, especially for humidity than other environmental factors. Through this research, Wanagama Education and Research Forest I can still stated as healthy ecosystem in terms of the high diversity and the abundance of bioindicators in three types of land observed. However, it is necessary to evaluate the impact of long-term land use management on the presence and diversity of soil arthropods.

Keywords: soil arthropod, land types, bioindicator, pioneer

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