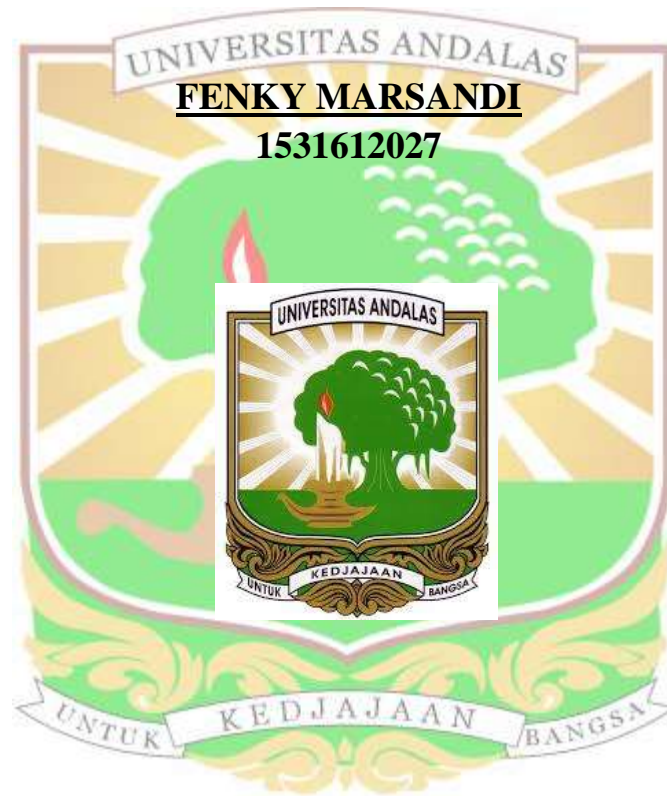


**PERUBAHAN KEANEKARAGAMAN BIOTA TANAH PADA
BEBERAPA TIPE PENGGUNAAN LAHAN KAWASAN HUTAN
HUJAN TROPIK BUKIT PINANG-PINANG PADANG, INDONESIA**

DISERTASI



**PROGRAM STUDI ILMU PERTANIAN
PROGRAM PASCASARJANA
UNIVERSITAS ANDALAS
2020**

PERUBAHAN KEANEKARAGAMAN BIOTA TANAH PADA BEBERAPA TIPE PENGGUNAAN LAHAN KAWASAN HUTAN HUJAN TROPIK BUKIT PINANG-PINANG PADANG, INDONESIA

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ABSTRAK

Penelitian perubahan keanekaragaman biota tanah pada beberapa tipe lahan kawasan hutan hujan tropik bukit Pinang-Pinang Padang, Indonesia merupakan rangkaian penelitian sejak tahun 1984. Penelitian ini bertujuan untuk mengkaji dan menjelaskan karakteristik perubahan keanekaragaman biota tanah yang terdiri atas fauna tanah dan bakteri tanah sebagai akibat perubahan penggunaan lahan dalam mendukung keberlanjutan ekosistem kawasan hutan hujan tropik bukit Pinang-Pinang Padang, Indonesia. Analisis kesuburan tanah ditentukan berdasarkan karakteristik kimia tanah, fisika tanah dan potensi hara serasah, sedangkan keanekaragaman fauna tanah dikaji hingga keanekaragaman fungsional yang menyusun rantai makanan fauna tanah pada masing-masing tipe lahan tersebut. Pada penelitian ini juga dilakukan analisis kepadatan populasi bakteri tanah hingga identifikasi molekuler bakteri tanah dominan sebagai faktor biotik dan komponen biota tanah lainnya. Selanjutnya, dilakukan analisis korelasi faktor biotik dan abiotik tanah dalam mempengaruhi kelimpahan dan keanekaragaman biota tanah. Hasil penelitian menunjukkan bahwa karakteristik kesuburan tanah tertinggi terdapat pada tipe lahan kebun monokultur dengan pH 5.78, N 0.56%, P 20.64 ppm, K 0.14 me/100gr, C 6.88% dan KTK 16.59 me/100gr. Sedangkan keanekaragaman fauna tanah tertinggi terdapat pada tipe lahan hutan yaitu bulan 1: 3.134, bulan ke-2: 3.313, bulan ke-3: 3.314 dan bulan ke-4: 2.890. Berdasarkan keanekaragaman tersebut didapatkan empat kelompok fungsional fauna tanah yang terdiri atas herbivora, predator, parasitoid dan detritivora yang membentuk struktur jaring makanan fauna tanah, di mana banyak tautan tingkat trofik jaring makanan fauna tanah yang terputus pada tipe lahan terbuka dan monokultur. Komponen biota tanah lainnya, yaitu bakteri tanah memiliki kepadatan populasi tertinggi pada tipe lahan kebun campuran 8.0162 log cfu/gr tanah. Tingkat keanekaragaman bakteri tanah berdasarkan tipe koloni tertinggi terdapat pada tipe lahan monokultur dengan jumlah 22 koloni bakteri. Selanjutnya, korelasi signifikan faktor abiotik dan biotik tanah terdapat pada pH tanah, kadar air tanah dan N serasah terhadap keanekaragaman fungsional fauna tanah herbivora dengan nilai signifikansi 0.022, 0.005 dan 0.010; kandungan P dan C serasah terhadap jumlah fauna tanah dengan nilai signifikansi 0.024 dan 0,050; kandungan N serasah terhadap keanekaragaman fauna tanah yaitu 0.041 dan kandungan P serasah terhadap keanekaragaman fauna tanah

detrivora yaitu 0.035, sedangkan korelasi kepadatan populasi bakteri dan keanekaragaman tipe koloni bakteri tanah tidak menunjukkan korelasi signifikan terhadap faktor abiotik tanah. Dari hasil penelitian, dapat disimpulkan bahwa perubahan penggunaan lahan kawasan hutan hujan tropik bukit Pinang-Pinang dapat mengakibatkan perubahan struktur komposisi dan keanekaragaman biota tanah yang berpotensi menimbulkan dampak pada terganggunya keseimbangan ekosistem.

Kata kunci: hutan, kesuburan tanah, keanekaragaman, fauna tanah, jaring makanan



CHANGES OF SOIL BIOTA DIVERSITY AT SEVERAL LAND USE TYPE IN TROPICAL RAINFOREST OF PINANG-PINANG HILL PADANG, INDONESIA

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ABSTRACT

Study changes of soil biota diversity in several land use types at tropical rainforest area in Pinang-Pinang Hill Padang, Indonesia is part of ecology research since 1984. The purpose of the study is to examine and explain the characteristics of soil biota diversity consist of soil fauna and soil bacteria which is caused by changes in land use type, for supporting the sustainability of tropical rainforest ecosystems in the Pinang-Pinang Hill Padang, Indonesia. Determining of soil fertility based on the characteristics of soil chemistry and soil physics. Potential and accumulation of litter for supporting soil fertility status. Soil fauna diversity assessed by shannon-winner index, evenness, dominance until functional diversity that makes up the food chain of soil fauna in the several land use type in Pinang-Pinang Hill. This study also conducted an analysis of the population density of soil bacteria and molecular identification of dominant soil bacteria as biotic factors and other soil biota components. Furthermore, an analysis of the relationship of biotic and abiotic factors in influencing the abundance and diversity of soil biota. The result showed that the highest of soil fertility characteristics were found in monoculture with pH 5.78, N 0.56%, P 20.64 ppm, K 0.14 me/100g, C 6.88%, and CEC 16.59 me/100g. The Highest soil fauna diversity was found in the forest, in 1st month 3.134, 2nd month 3.313, 3rd month 3.314 and 4th month 2.890. Based on this diversity, there are four functional trophic level of soil fauna consisting of herbivores, predators, parasitoids and detritivores that make the structure of the food web of soil fauna. There are many of the trophic level links are broken of the soil fauna food web in the open area and monoculture. Other soil biota components of soil microbe namely soil bacteria, have the highest population density in mixed garden 8.0162 log cfu/gr. The highest level of diversity of soil bacteria by type of colony was found in monoculture with total of colony 22 bacterial colonies. Furthermore, significant correlations of soil abiotic and biotic factors were found in soil pH, soil water content, and N litter on functional diversity of soil fauna herbivore with significance values of 0.022, 0.005 and 0.010; content of litter P and C on the abundance of soil fauna with significance values 0.024 and 0.050; content of litter N on soil fauna diversity 0.041; and content of P litter with soil fauna diversity of detritivore 0.035. Correlation between bacterial population density and diversity of soil bacterial colony types has not show a significant correlation

to soil abiotic factors. It can be concluded that changes in land use type of the tropical rainforest area in the Pinang-Pinang Hill may changes the composition structure and diversity of soil biota which has the potential to have an impact on disrupting the ecosystem balance.

Keywords: Forest, soil fertility, diversity, soil fauna, food web

