

INTISARI

Karbon (C), nitrogen (N), dan fosfor (P) merupakan elemen penting pada ekosistem, yang membentuk siklus biogeokimia dan menjadi elemen biogenik dasar yang dibutuhkan oleh organisme hidup. Hutan yang menjadi kontributor utama dalam siklus biogeokimia, kaya akan keanekaragaman jenis pohon, yang setiap jenisnya memiliki pengaruh yang berbeda terhadap ekosistem. Keanekaragaman jenis pohon dapat mempengaruhi produksi biomassa dan sifat tanah di bawahnya, termasuk kandungan karbon, nitrogen, dan fosfor. Penelitian ini bertujuan untuk menganalisis pengaruh perbedaan jenis tegakan hutan terhadap variasi kandungan karbon, nitrogen, dan fosfor pada tanah dan produksi biomassa. Penelitian dilakukan di Kawasan Hutan dengan Tujuan Khusus (KHDTK) Wonogiri. Pengambilan sampel tanah dilakukan dengan metode *purposive random sampling* pada tegakan akasia (*Acacia mangium*), eukaliptus (*Eucalyptus pellita*), dan jati (*Tectona grandis*) serta semak belukar yang ada dalam cakupan lokasi penelitian. Pengukuran biomassa pohon dilakukan dengan metode *non-destructive*, sedangkan pengambilan sampel tumbuhan bawah dan serasah tanaman dilakukan dengan metode *destructive*. Biomassa pohon dihitung menggunakan persamaan alometrik untuk masing-masing jenis pohon. Kandungan karbon, nitrogen, dan fosfor pada tanah dan tanaman diukur di laboratorium dan data yang didapat dianalisis dengan uji ANOVA dilanjutkan dengan uji lanjut *Least Significant Difference* (LSD). Hasil penelitian menunjukkan bahwa perbedaan jenis tegakan hutan mempengaruhi produksi biomassa serta kandungan karbon, nitrogen, dan fosfor pada tanah dan tanaman. Berdasarkan uji beda nyata terkecil, antartegakan memberikan hasil yang berbeda nyata.

Kata kunci: karbon, nitrogen, fosfor, biomassa, tegakan hutan

ABSTRACT

*Carbon (C), nitrogen (N), and phosphorus (P) are essential elements in ecosystems, forming biogeochemical cycles and being the basic biogenic elements required by living organisms. Forests, which are important contributors to biogeochemical cycles, are rich in a diversity of tree species, each of which has a different influence on the ecosystem. Tree species diversity can influence biomass production and underlying soil properties, including carbon, nitrogen, and phosphorus content. This study aims to analyze the effect of different forest stand types on variations in soil carbon, nitrogen, and phosphorus content and biomass production. The research was conducted in the Special Purpose Forest Area (KHDTK) in Wonogiri. Soil sampling was carried out using a purposive random sampling method in acacia (*Acacia mangium*), eucalyptus (*Eucalyptus pellita*), and teak (*Tectona grandis*) stands and shrubs within the research site. Tree biomass measurements were conducted using non-destructive methods, while understory and litter sampling were conducted using destructive methods. Tree biomass was calculated using allometric equations for each tree species. Carbon, nitrogen, and phosphorus contents in soil and plants were measured in the laboratory, and the data obtained were analyzed by ANOVA test followed by the Least Significant Difference (LSD) test. The results showed that different types of forest stands affected biomass production as well as carbon, nitrogen, and phosphorus content in soil and plants. Based on the least significant difference test, the results between forest stand types were significantly different.*

Key words: carbon, nitrogen, phosphorus, biomass, forest stand