Potensi Simpanan Karbon Jenis Tanaman Jati Klon pada Berbagai Variasi Jarak Tanam di Khdtk Getas,
Ngawi, Jawa Timur
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POTENSI SIMPANAN KARBON JENIS TANAMAN JATI KLON PADA BERBAGAI VARIASI JARAK TANAM DI KHDTK GETAS, NGAWI, JAWA TIMUR

Amanullah Diar Pratama[1], Ris Hadi Purwanto[2]

INTISARI

Hutan berperan penting sebagai penyerap dan penyimpan karbon untuk mengurangi dampak perubahan iklim akibat meningkatnya konsentrasi gas rumah kaca. Salah satu jenis tanaman yang berpotensi tinggi menyimpan karbon adalah jati klon (*Tectona grandis* L.f.) yang memiliki pertumbuhan relatif cepat. Penelitian ini bertujuan untuk mengestimasi biomassa, simpanan karbon, serapan CO_2, dan karbon organik tanah (*Soil Organic Carbon*/SOC), serta menganalisis pengaruh variasi jarak tanam terhadap simpanan karbon pada tegakan jati klon di KHDTK Getas, Ngawi Jawa Timur.

Penelitian dilakukan pada tegakan jati klon dengan variasi jarak tanam. Pendugaan biomassa tegakan jati klon dilakukan secara *non-destructive* pada 35 plot ukur yang terbagi ke dalam tiga jarak tanam. *Aboveground biomass* diestimasi menggunakan persamaan alometrik Purwanto *et al*. (2025), sedangkan *belowground biomass* menggunakan persamaan Cairns *et al*. (1997). Sampel tanah untuk analisis *Soil Organic Carbon* (SOC) diambil secara terusik dan tidak terusik pada kedalaman 0-10 cm, 10-20 cm, dan 20-30 cm, kemudian dianalisis menggunakan metode Walkley & Black dan *Loss On Ignition* (LOI).

Hasil penelitian menunjukkan bahwa jarak tanam 5 x 5 m memiliki rerata biomassa tertinggi sebesar 50,828 ton/ha, simpanan karbon 23,889 ton/ha, dan serapan CO_2 sebesar 87,673 ton/ha. Nilai SOC stock tertinggi terdapat pada jarak tanam 3 x 3 m sebesar 31,988 ton/ha berdasarkan metode Walkley & Black dan 117,438 ton/ha berdasarkan metode *Loss On Ignition* (LOI). Metode LOI menghasilkan estimasi SOC lebih tinggi dibandingkan Walkley & Black. Hasil uji statistik menunjukkan bahwa variasi jarak tanam berpengaruh signifikan terhadap biomassa, simpanan karbon, dan serapan CO_2, sedangkan terhadap SOC stock tidak berpengaruh signifikan.

Kata kunci: jati klon, biomassa, simpanan karbon, serapan CO_2, karbon organik tanah, kedalaman tanah.

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CARBON STORAGE POTENTIAL OF TEAK CLONE TYPES IN VARIOUS SPACING IN KHDTK GETAS, NGAWI, EAST JAVA

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ABSTRACT

Forests have an important role as carbon sinks and carbon reservoirs in mitigating climate change caused by increasing greenhouse gas concentrations. One tree species with high carbon storage potential is cloned teak (Tectona grandis L.f.), which is characterized by relatively rapid growth. This study aimed to estimate biomass, carbon stock, CO_2 sequestration, and Soil Organic Carbon (SOC), as well as to analyze the effect of planting spacing variation on carbon storage in cloned teak stands at KHDTK Getas, Ngawi, East Java.

The study was conducted in cloned teak stands with different planting spacings. Biomass was estimated using a non-destructive method on 35 sample plots representing three planting spacings. Aboveground biomass was estimated using the allometric equation developed by Purwanto et al. (2025), while belowground biomass was estimated using the equation proposed by Cairns et al. (1997). Soil samples, including disturbed and undisturbed samples, were collected at depths of 0–10 cm, 10–20 cm, and 20–30 cm for Soil Organic Carbon (SOC) analysis using the Walkley–Black and Loss on Ignition (LOI) methods.

The results showed that the 5 × 5 m planting spacing had the highest mean biomass (50,828 tons/ha), carbon stock (23,889 tons/ha) and CO_2 sequestration (87,673 tons/ha). The highest SOC stock was found under the 3 × 3 m planting spacing, reaching 31,988 tons/ha based on the Walkley–Black method and 117,438 tons/ha based on the LOI method. The LOI method produced higher SOC estimates than the Walkley–Black method. Statistical analysis indicated that planting spacing had a significant effect on biomass, carbon stock, and CO_2 sequestration, but no significant effect on SOC stock.

Keywords: clonal teak, biomass, carbon stock, CO_2 sequestration, soil organic carbon, soil depth.

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