

EVALUASI VARIASI LONGITUDINAL PADA SIFAT FISIKA DAN MEKANIKA BAMBU WULUNG (*Gigantochloa atroviolacea*) DARI HUTAN RAKYAT DI KABUPATEN KULON PROGO, YOGYAKARTA

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ABSTRAK

Bambu Wulung (*Gigantochloa atroviolacea*) merupakan salah satu jenis bambu yang memiliki potensi sebagai material konstruksi pengganti kayu. Potensi bambu di Kabupaten Kulon Progo, D.I. Yogyakarta, cukup besar mengingat ketersediaannya yang melimpah di wilayah tersebut. Namun demikian, informasi terkait sifat bambu wulung khususnya sifat fisika dan mekanika pada variasi longitudinalnya masih terbatas. Penelitian ini bertujuan untuk mengevaluasi variasi longitudinal pada sifat fisika dan mekanika bambu wulung yang tumbuh alami di hutan rakyat Kulon Progo, D.I. Yogyakarta, Indonesia. Hasil penelitian menunjukkan bahwa nilai rata-rata diameter, tinggi total, dan tebal batang bambu masing-masing adalah sebesar 8,9 cm; 17,9 m; dan 0,74 cm. Sementara itu, nilai rata-rata kerapatan dasar, kadar air segar, penyusutan radial dan tangensial pada setiap perubahan kadar air 1%, modulus elastisitas (MOE) dan modulus patah (MOR) berturut-turut adalah sebesar 0,60 g/cm³; 93,7%; 0,36%; 0,29%; 11,67 GPa dan 130,5 MPa. Model pola variasi longitudinal menunjukkan bahwa Model efek campuran linier (Model I) sesuai untuk nilai kadar air segar dan modulus patah MOR. Sementara itu, model efek campuran non-linier (Model II) lebih sesuai untuk nilai tebal bambu, kerapatan dasar, penyusutan radial dan tangensial pada setiap perubahan kadar air 1%, serta modulus elastisitas (MOE). Terdapat hubungan korelasi yang sangat signifikan antar nilai kerapatan dasar dengan kadar air segar dan sifat mekanika bambu wulung khususnya nilai modulus patah (MOR). Hal ini berarti bahwa kerapatan dasar bambu wulung dapat menjadi prediktor yang baik untuk mengetahui nilai kadar air segar dan sifat mekanika bambu khususnya modulus patah (MOR). Sementara itu, nilai modulus elastisitas (MOE) juga dapat diprediksi dari nilai modulus patah (MOR).

Kata kunci: Bambu wulung, hutan rakyat, sifat fisika, sifat mekanika, variasi longitudinal

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EVALUATION OF LONGITUDINAL VARIATION IN PHYSICAL AND MECHANICAL PROPERTIES OF (*Gigantochloa atroviolacea*) FROM COMMUNITY FORESTS IN KULON PROGO, YOGYAKARTA

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ABSTRACT

Gigantochloa atroviolacea is one of the bamboo species that has high potential as a construction material to replace wood. Its potential in Kulon Progo, D.I. Yogyakarta, is quite large considering its abundant availability in the region. However, information related to the properties of *G. atroviolacea*, especially the physical and mechanical properties in its longitudinal variation is still limited. This study aimed to evaluate the longitudinal variation in the growth characteristics and physical-mechanical properties of *G. atroviolacea* naturally grown in the community forest of Kulon Progo, D.I. Yogyakarta, Indonesia. The results showed that the mean values of diameter, total height, and thickness of bamboo stems were 8.9 cm; 17.9 m; and 0.74 cm, respectively. Meanwhile, the mean values of basic density, green moisture content, shrinkage at 1% moisture content change in radial and tangential directions, modulus of elasticity (MOE), and modulus of rupture (MOR) were 0.60 g/cm³; 93.7%; 0.36%; 0.29%; 11.67 GPa, and 130.5 MPa, respectively. The longitudinal variation pattern model showed that the linear mixed effect model (Model I) was suitable for the green moisture content and modulus of rupture (MOR). Meanwhile, the non-linear mixed effect model (Model II) was suitable for the bamboo thickness, basic density, shrinkage at 1% moisture content change in radial and tangential directions, and modulus of elasticity (MOE). The significant correlation between basic density with the green moisture content and mechanical properties, especially the modulus of rupture (MOR), was found in *G. atroviolacea*. This means that the basic density of *G. atroviolacea* can be a good predictor for determining the green moisture content and mechanical properties of bamboo, especially modulus of rupture (MOR). Meanwhile, the modulus of elasticity (MOE) value can also be predicted from the modulus of rupture (MOR).

Keywords: *Gigantochloa atroviolacea*, community forest, physical properties, mechanical properties, longitudinal variation.

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