PENGARUH VARIASI LONGITUDINAL TERHADAP SIFAT FISIKA DAN MEKANIKA BAMBU ORI (*Bambusa blumeana*) DARI HUTAN RAKYAT KABUPATEN KULON PROGO, YOGYAKARTA

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ABSTRAK

Bambu merupakan sumber daya alam potensial di Asia, terutama Asia Tenggara, dan dimanfaatkan dalam berbagai aspek kehidupan. Bambu ori (*Bambusa blumeana*) berpotensi sebagai bahan konstruksi alternatif di Indonesia, khususnya di Yogyakarta di mana bambu ini banyak tumbuh di hutan rakyat. Di Kulon Progo, hutan rakyat berperan penting bagi perekonomian masyarakat, namun kajian tentang variasi sifat fisika dan mekanika bambu ori dari wilayah ini masih terbatas. Penelitian ini bertujuan untuk mengetahui pengaruh variasi longitudinal terhadap karakteririk pertumbuhan, sifat fisika dan mekanika bambu ori yang tumbuh di hutan rakyat Kulon Progo, D.I. Yogyakarta, Indonesia dengan permodelan efek campuran linear dan non-linier. Hasil penelitian ini menunjukkan bahwa nilai rata-rata diameter, tinggi total, dan tebal batang bambu masing-masing adalah sebesar 9,9 cm; 20,6 m; dan 0,99 cm. Sementra itu, nilai rata-rata kerapatan dasar, kadar air segar, penyusutan radial dan tangensial pada setiap perubahan kadar air 1%, MOE dan MOR berturut-turut adalah sebesar 0,62 g/cm^3; 87,5%; 0,31%; 0,26%; 11,63 Gpa, dan 137,2 Mpa. Model pola variasi longitudinal menunjukkan bahwa model efek campuran non-linier (Model II) sesuai pada setiap parameter yang di uji baik itu karakteristik pertumbuhan, sifat fisika maupun sifat mekanika. Terdapat korelasi yang sangat signifikan antara nilai kerapatan dasar dengan kadar air dan sifat mekanika (MOR) bambu ori. Selain itu terdapat korelasi signifikan antara nilai tebal bambu dengan sifat mekanika (MOR) bambu ori. Hal ini berarti bahwa kerapatan dasar dapat menjadi prediktor yang baik untuk mengetahui nilai kadar air dan sifat mekanika khusunya MOR. Sementara itu, nilai MOE juga dapat diprediksi dari nilai MOR.

Kata kunci: Bambu ori, variasi longitudinal, kerapatan dasar, modulus elastisitas, modulus patah.

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THE EFFECT OF LONGITUDINAL VARIATION ON THE PHYSICAL AND MECHANICAL PROPERTIES OF BAMBU ORI (*Bambusa blumeana*) FROM COMMUNITY FORESTS IN KULON PROGO, YOGYAKARTA

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ABSTRACT

Bamboo is a potential natural resource in Asia, especially Southeast Asia, and is utilized in various aspects of life. *Bambusa blumeana* has the potential as an alternative construction material in Indonesia, especially Yogyakarta, where this bamboo grows abundantly in community forests. In Kulon Progo, community forests play an important role in the community's economy, but studies on the variation of physical and mechanical properties of *Bambusa blumeana* from this region are still limited. This study aimed to determine the effect of longitudinal variation on the growth characteristics and physical and mechanical properties of *Bambusa blumeana* naturally grown in the community forest of Kulon Progo, Yogyakarta, Indonesia, with linear and non-linear mixed-effect modeling. The results showed that the mean values of diameter, total height, and thickness of bamboo stems were 9.9 cm; 20.6 m; and 0.99 respectively. Meanwhile, the mean values of basic density, green moisture content, shrinkage at 1% moisture content change in radial and tangential directions, MOE, and MOR were 0.62 g/cm^3; 87.5%; 0.31%; 0.26%; 11.63 GPa, and 137.2 MPa, respectively. The longitudinal variation pattern model showed that the nonlinear mixed effects model (Model II) was suitable for all tested parameters, including growth characteristics, physical properties, and mechanical properties. The significant correlation between basic density with both moisture content and MOR was found in *Bambusa blumeana*. In addition, bamboo thickness shows a significant correlation with MOR. These findings suggest that basic density is considered to be a good predictor for determining both moisture content and mechanical properties, particularly MOR. Furthermore, the MOE can also be predicted based on MOR.

Keywords: *Bambusa blumeana*, longitudinal variation, basic density, modulus of elasticity, modulus of rupture.

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