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**VARIASI RADIAL PROPORSI SEL DAN DIMENSI SERAT KAYU  
PADA TIGA GENERASI *Acacia mangium*  
DARI ALAS KETHU, WONOGIRI**

Oleh:  
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**INTISARI**

Dua siklus generasi pemuliaan tanaman *Acacia mangium* telah dilaksanakan dengan hasil perbaikan volume tegakan dan bentuk batang. Namun, dampak hasil pemuliaan tersebut terhadap kualitas kayu masih belum diketahui. Penelitian ini bertujuan untuk mengamati dan membandingkan sifat anatomi kayu dari tiga siklus generasi pemuliaan tanaman tersebut, yaitu siklus generasi pertama (F-1), siklus generasi kedua (F-2) dan kontrol yang merupakan generasi belum dilakukan pemuliaan (F-0).

Penelitian menggunakan rancangan acak lengkap dengan dua faktor yaitu generasi pemuliaan dan kedudukan radial batang. Pengamatan dilakukan pada tiga generasi yaitu F-1, F-2, dan F-0 dan masing-masing diamati pada tiga kedudukan radial, yaitu dekat hati, tengah, dan dekat kulit. Sifat kayu dinilai dari proporsi sel (serabut, pembuluh, parenkim longitudinal, dan parenkim jari-jari), dimensi serat (panjang, diameter sel, diameter lumen, dan tebal dinding sel), dan nilai turunan dimensi seratnya (bilangan Runkel, perbandingan Muhssteph, daya tenun, perbandingan fleksibilitas, dan koefisien kekakuan).

Hasil pengamatan menunjukkan nilai rerata ( $\pm$  standar deviasi) sifat kayu sebagai berikut: proporsi sel serabut  $64,03\% \pm 3,75$ ; proporsi sel pembuluh  $13,87\% \pm 2,7$ ; proporsi sel parenkim longitudinal  $12,05\% \pm 1,8$ ; proporsi sel parenkim jari-jari  $10,22\% \pm 0,95$ ; panjang serat  $909,82 \mu\text{m} \pm 0,09$ ; diameter sel serat  $18,1 \mu\text{m} \pm 1,46$ ; diameter lumen serat  $13,52 \mu\text{m} \pm 1,57$ ; tebal dinding serat  $2,27 \mu\text{m} \pm 0,2$ ; bilangan Runkel  $0,34 \pm 0,06$ ; perbandingan Muhssteph  $44,3\% \pm 4,78$ ; daya tenun  $50,79 \pm 7,58$ ; perbandingan fleksibilitas  $0,75 \pm 0,03$ ; dan koefisien kekakuan  $0,13 \pm 0,02$ . Faktor generasi berpengaruh pada proporsi sel serabut, dimensi serat (kecuali panjang serat), dan nilai turunan dimensi seratnya. Faktor kedudukan radial batang berpengaruh terhadap proporsi sel serabut dan pembuluh, dimensi serat, dan nilai turunan dimensi seratnya. Interaksi dua faktor tidak berpengaruh pada sifat kayu. Sebagai bahan baku pulp dan kertas, sifat kayu dari generasi F-2 dan F-0 hampir sama kecuali pada parameter proporsi pembuluh dan tebal dinding serat, dan keduanya cenderung lebih baik dari F-1. Generasi F-2 diprediksi lebih baik mengingat volume tegakannya lebih besar dan bentuk batangnya lebih baik. Pada kedudukan radial, bagian dekat hati diprediksi lebih baik untuk menjadi bahan baku pulp dan kertas.

Kata kunci: *Acacia mangium*, pemuliaan tanaman, proporsi sel, dimensi serat, turunan dimensi serat, pulp dan kertas

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**RADIAL VARIATIONS OF  
CELL PROPORTION AND WOOD FIBER DIMENSIONS  
IN THREE GENERATIONS OF *Acacia mangium*  
FROM ALAS KETHU, WONOGIRI**

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**ABSTRACT**

Two breeding cycles of *Acacia mangium* have been carried out and gained an increases in tree volume and stem form. However, the impacts of such improvement to the wood properties were still unknown. This research was intended to observe and compare wood anatomical properties of those trees from three generations of breeding: first generation (F-1), second generation, and unimproved generation (F-0) as a control.

The experimental design was completely randomized design with two factorials: generation of breeding and wood radial positions. Observations were made on three generations of breeding: F-1, F-2, and F-0. Each of them was observed at three radial positions: near-pith, middle, and near-bark. Wood properties assessed were cell proportions (fiber, vessel, longitudinal parenchyma, and ray parenchyma), fiber dimensions (length, cell diameter, lumen diameter, and wall thickness), and fiber derived values (Runkel ratio, Muhlsteph ratio, felting power, flexibility ratio, and coefficient of rigidity).

The average ( $\pm$  standard deviation) of the observed wood properties were as follows: fiber proportion was  $64.03\% \pm 3.75$ , vessel proportion was  $13.87\% \pm 2.7$ , longitudinal parenchyma proportion was  $12.05\% \pm 1.8$ , ray parenchyma proportion was  $10.22\% \pm 0.95$ , fiber length was  $909,82 \mu\text{m} \pm 0.09$ , fiber diameter was  $18.1 \mu\text{m} \pm 1.46$ , fiber lumen diameter was  $13.52 \mu\text{m} \pm 1.57$ , fiber cell wall thickness was  $2.27 \mu\text{m} \pm 0.2$ , Runkel ratio was  $0.34 \pm 0.06$ , Muhlsteph ratio was  $44.3\% \pm 4.78$ , felting power was  $50.79 \pm 7.58$ , flexibility ratio was  $0.75 \pm 0.03$ , and coefficient of rigidity was  $0.13 \pm 0.02$ . Generation of breeding significantly affected proportion of fiber, fiber dimensions (except fiber length), and fiber derived values. Radial positions factor significantly affected proportion of fiber and vessel, fiber dimensions, and fiber derived values. The effect of generation  $\times$  radial position interaction was not significant. As raw material for pulp and paper, wood properties of F-2 and F-0 were similar except on vessel proportion and fiber wall thickness, and both were relatively better than F-1. The trees derived from F-2 was predicted to be better regarding higher stand volume and better tree form. On radial direction, wood from near-pith position was predicted to be better as pulp and paper material.

**Keywords:** *Acacia mangium*, tree improvement, cell proportions, fiber dimensions, fiber derived values, pulp and paper

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