

# Anatomical Variation on Some Wood Collected from Meru Betiri National Park

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## ABSTRACT

Some plants that have wood economically value are found at Meru Betiri National Park, such as nyampuh (*Litsea monopetala* (Roxb.) Pers.), bayur (*Pterospermum javanicum* Jungh.), gempol kethek (*Lophopetalum javanicum* (Zoll.) Turcz.), suren (*Toona sureni* Merr.), sapen (*Pomentia tomentosa* T. & B.), manting (*Eugenia cymosa* Lamk.), pluncing (*Spondias pinnata* (L.F.) Kurz.), mahoni (*Swietenia macrophylla* King), and bungur (*Lagerstoemia speciosa* Pers.). Anatomically, wood has specific and unique structure. Wood is a secondary xylem that consist of tracheary elements such as vessel and tracheid, fibers such as fiber-tracheid and libriform fiber, and parenchyma cells (ray system). The pattern of wood section is affected by intrinsic factors. Wood was sectioned in 2X1 cm<sup>2</sup> in measurement and then it was boiled during 1 hour, after that it was immersed in mixed solution glycerin and absolute alcohol (1:1) during several weeks until the wood smooth adequately to sliced. Wood was sliced by sliding microtome 20-25 µm in thickness, and then it was placed on the objectglass that contain glycerin and covered by coverglass, after that it was observed by microscope. There was anatomically variation of wood samples that observed, involved trachea and tracheid width, also schlerenchyme fiber length. Vessel of nyampuh is the biggest in diameter (35±4.7 µm), and parenchyma ray of suren is the longest in length (70±9.3 µm) among other species.

**Keywords** : Anatomy, Meru Betiri National Park, microscope, wood, xylem.

## INTRODUCTION

Meru Betiri National Park is located in South part of East Java. As a conservation region, the presence of woody plants is protected by government. Some woody plants that have economically value grown, unfortunately illegal logging often occurred at this national park.

Wood is a secondary xylem that consist of tracheary elements such as vessel and tracheid, fibers such as fiber-tracheid and libriform fiber, and parenchyma cells (ray system) [1,2,3]. Tracheary is the most highly specialized cells of the xylem and are concerned with the conduction of water and substances dissolved water. The form of tracheary is more or less elongated cells, nonliving at maturity. Tracheary elements have lignified walls with

secondary thickenings and a variety of pits [4,5]. The two kinds of tracheary cells, the tracheids and the vessels, differ from each other in that the tracheid is an imperforate cell [6,7,8]. In tracheids, the passage of water from cell occurs mainly through pit-pairs. Longitudinal series of vessels interconnected through their perforations. The fibers are long cells with lignified walls. The walls usually thicker than the walls of tracheids. The parenchyma of the secondary xylem is represented by the axial parenchyma and the ray parenchyma [8,9].

The objective of the study was to compare wood anatomy structure of some woody plants of Meru Betiri National Park.

## METHODS

There were 9 (nine) species of wood plant that observed, namely nyampuh (*Litsea monopetala* (Roxb.) Pers.), bayur (*Pterospermum javanicum* Jungh.), gempol kethek (*Lophopetalum javanicum* (Zoll.)

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Turcz.), suren (*Toona sureni* Merr.), sapen (*Pomentia tomentosa* T.&B.), manting (*Eugenia cymosa* Lamk.), pluncing (*Spondias pinnata* (L.F.) Kurz.), mahoni (*Swietenia macrophylla* King), and bungur (*Lagerstoemia speciosa* Pers.).

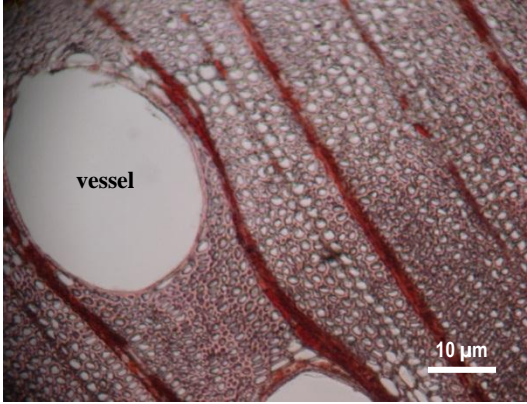
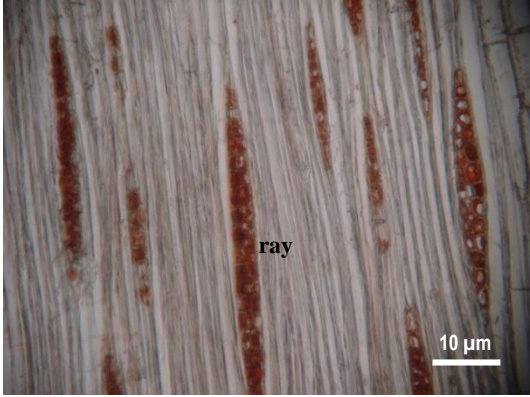
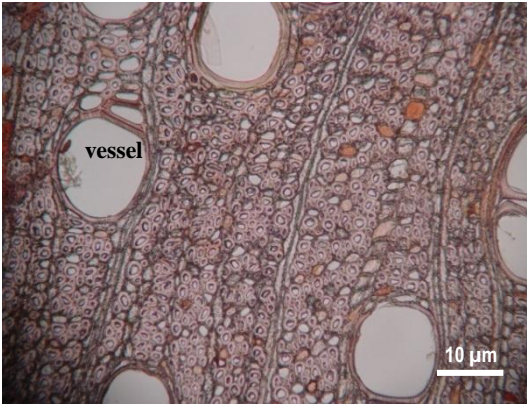
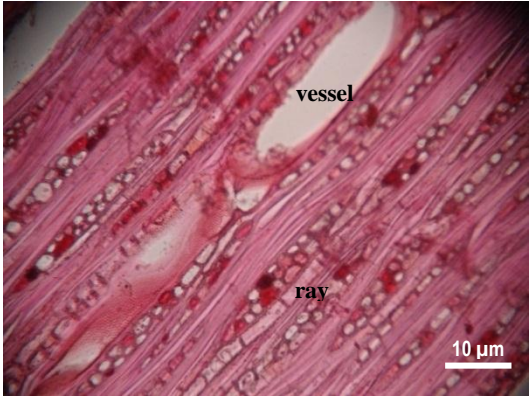
Wood was sectioned in 2×1 cm<sup>2</sup> in measurement and then it was boiled during 1 hour, after that it was immersed in mixed solution glycerin and absolute alcohol (1:1) during several weeks until the wood smooth adequately to sliced. Wood was sliced by sliding microtome 20-25 μm in thickness, the orientation of wood section were cross and longitudinal section, and then it was placed on the objectglass that contain glycerin and

covered by coverglass, after that it was observed by microscope on 400× magnification [10].

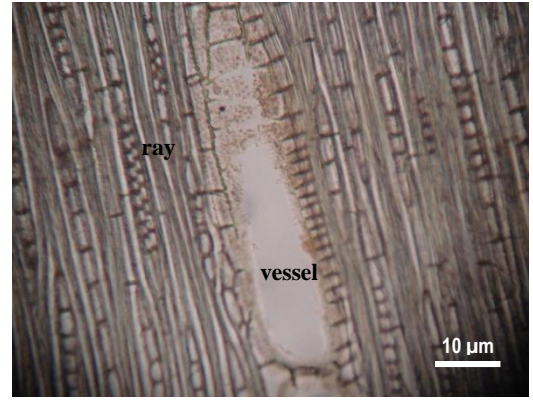
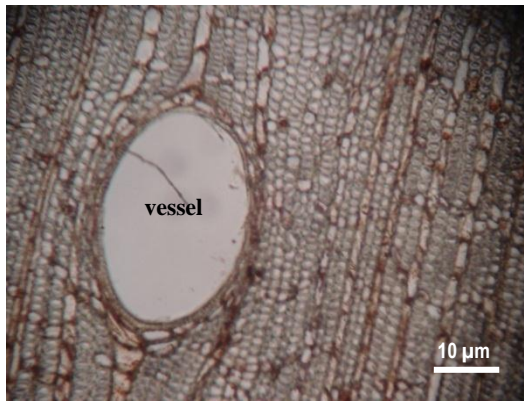
**RESULT AND DISCUSSION**

The results showed that there was anatomically variation on wood samples that observed, involved vessel width, also parenchyma ray length. Vessel of nyampuh is the biggest in diameter (35±4.7 μm), and parenchyma ray of suren is longest in length (70±9.3 μm). Table 1 resumed the wood section of 9 species that collected from Meru Betiri National Park.

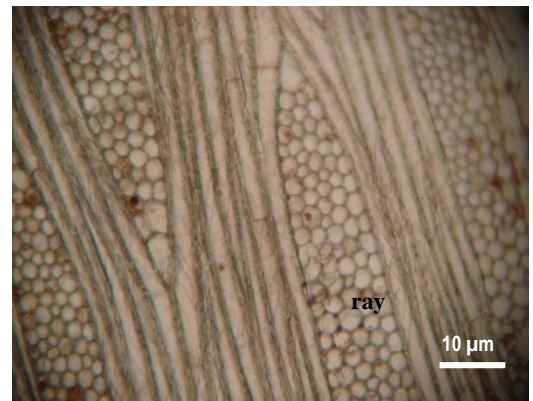
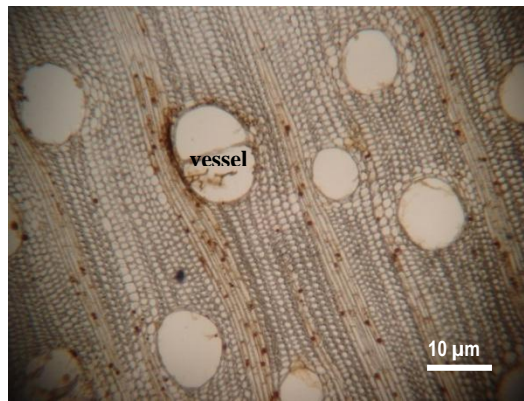
**Table 1.** Comparison of some wood anatomy section collected from Meru Betiri National Park

SPECIES	CROSS SECTION	LONGITUDINAL SECTION
<b>Nyampuh</b> ( <i>Litsea monopetala</i> )		
<b>Bayur</b> ( <i>Pterospermum javanicum</i> )		

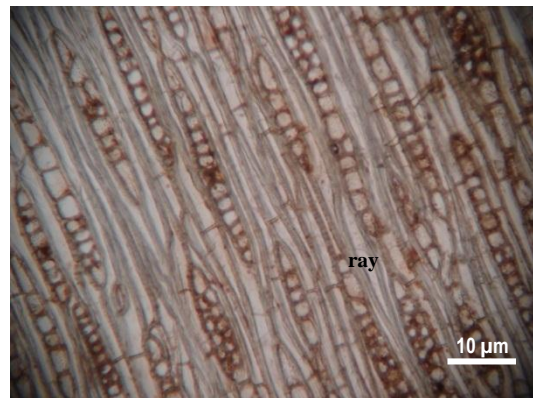
**Gempol Kethek**  
(*Lophopetalum javanicum*)



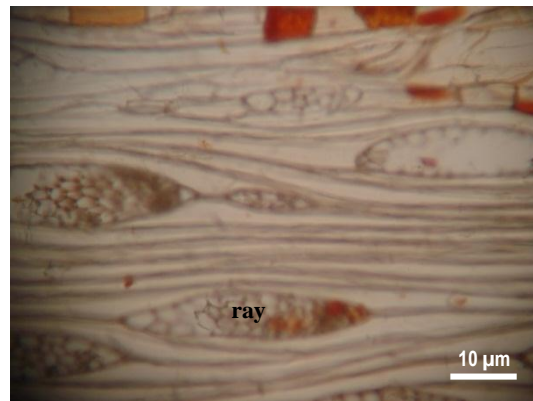
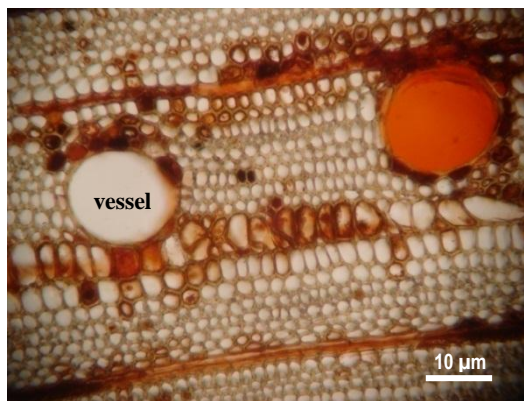
**Suren**  
(*Toona sureni*)

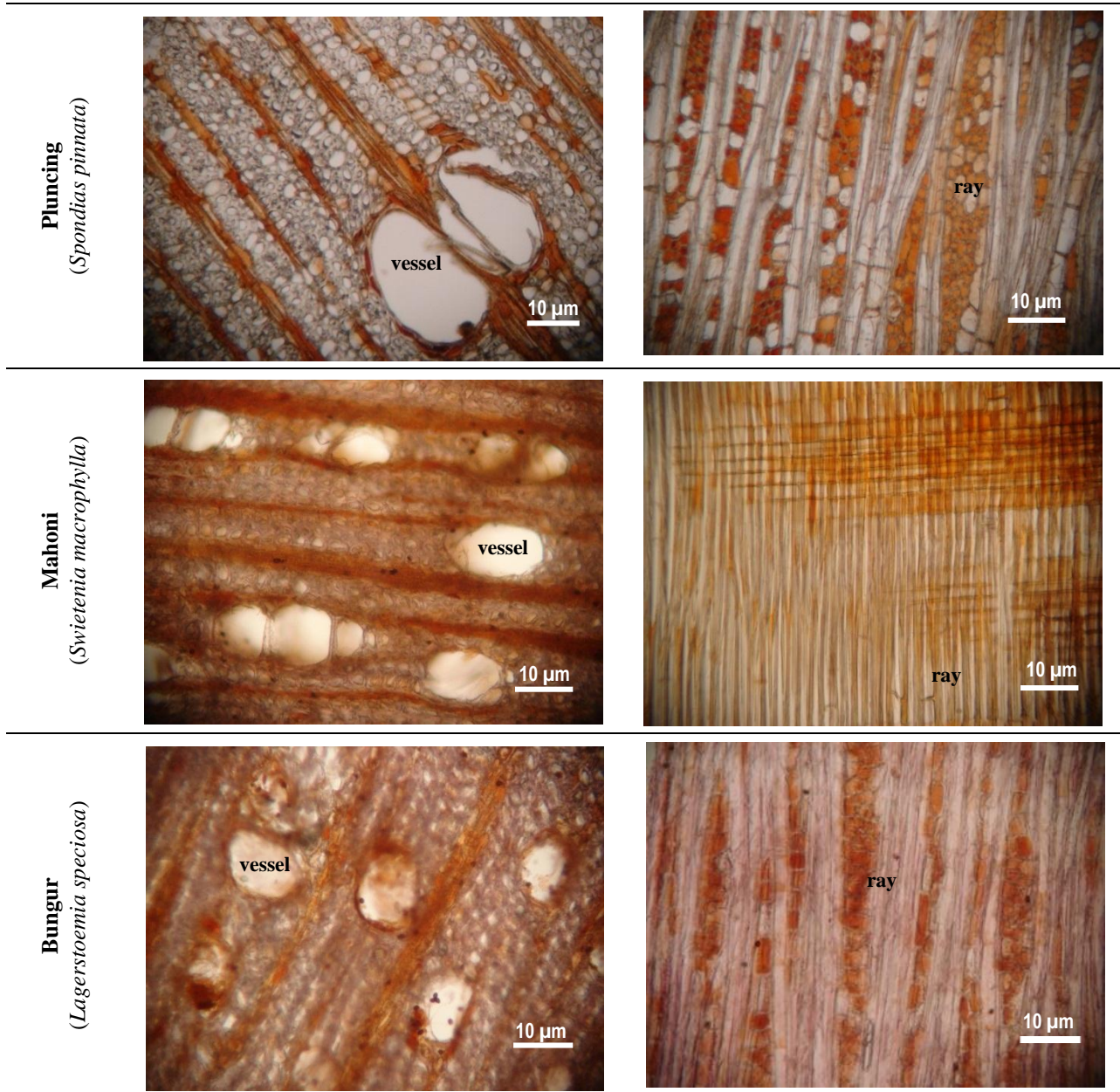


**Sapen**  
(*Pometia tomentosa*)



**Manting**  
(*Eugenia cymosa*)





**Table 2.** Measurement of vessel diameter length and parenchyma ray length of some wood collected from Meru Betiri National Park.

No	Species	Length diameter of vessel (µm)	Length of parenchyma ray (µm)
1	<i>L. monopetala</i>	35±4.7	50±4.8
2	<i>P. javanicum</i>	13±7.4	35±9.3
3	<i>L. javanicum</i>	30±6.3	35±6.8
4	<i>T. sureni</i>	13±3.9	70±9.3
5	<i>P. tomentosa</i>	25±8.5	40±9.3
6	<i>E. cymosa</i>	16±7.6	35±11.7
7	<i>S. pinnata</i>	25±6.3	65±8.6
8	<i>S. macrophylla</i>	16±8.2	40±5.7
9	<i>L. speciosa</i>	13±9.4	45±7.2

All of samples observed were woody dicotyledonous plants, due to the structure of wood contain tracheary elements (vessels and tracheids), fibers, and parenchyma cells [6,7,8, 9]. Although there were similarity of wood anatomy structure on samples that observed, but there were variation of length of tracheary elements and parenchyma ray (Table 2).

### CONCLUSION

There was anatomically variation of wood samples that observed, involved vessel width, also parenchyma ray length. Vessel of *Litsea*

*monopetala* is the biggest in diameter ( $35\pm 4.7$   $\mu\text{m}$ ), and parenchyma ray of *Toona sureni* is the longest in length ( $70\pm 9.3$   $\mu\text{m}$ ) among other species.

#### ACKNOWLEDGMENT

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