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NUTRIENT CONCENTRATION OF MG OF EUCALYPTUS PELLITA F. MUELL TREE COMPONENTS IN EAST KALIMANTAN, INDONESIA

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ABSTRACT
Eucalyptus pellita F. Muell is a species cultivated in industrial forest plantations. Three circle plots (r = 12.6 m) were made for the plant ages of 1, 3, 5 and 13 years. The census was applied for an inventory of tree diameters and 24 representative trees were harvested for analysis of tree component nutrient concentrations. The purpose of this study was to determine the nutrient concentration Mg components of *Eucalyptus pellita* F. Muell trees aged 1, 3, 5 and 13 years. Nutrient analysis of Mg used Atomic Absorption Spectrophotometry (AAS). The results of the analysis show that The highest average concentration of Mg in *Eucalyptus pellita* F. Muell tree components aged 1 year was found in the leaf component (0.90 mg/g), the lowest was in the wood branches + twigs (0.13 mg/g); at aged 3 years, the highest concentration was in the leaf component (1.10 mg/g), while the lowest was in stem wood (0.17 mg/g). At age of 5 years, the highest concentration of Mg was in branch bark + twigs (4.48 mg/g), while lowest was in stem wood (0.43 mg/g). At age of 13 years, the highest concentration of Magnesium was in the leaf component (1.07 mg/g), while the lowest magnesium concentration was in the woody branch + twig component (0.17 mg/g). The difference in nutrient concentration was influenced by the difference in age of stands and soil type.

KEY WORDS
Nutrient concentration, *Eucalyptus pellita*, magnesium.

Plant nutrition refers to how plants obtain, distribute, and use nutrients in various processes and reactions that take place in plants for plant growth and development (Munawar, 2011).Magnesium is one of the nutrients included in the macronutrients (Mengel and Kirkby, 1978). Magnesium is absorbed by plants in the form of Mg2+ ion which is an important element in plants as a constituent of chlorophyll (Rosmarkam and Yuwono, 2002).

Eucalypt wood is popular as a-raw-material for pulping (Pirallho, 2014), More than 500 species of *Eucalyptus* in Australian including in the island of Indonesia, Papua new Guinea and the Philippines (Turnbull, 1999).

Eucalyptus pellita F.Muell is a fast-growing plant that has special qualities as a plant that has a short rotation, less disease attacks and has high economic value (Sulichantini, 2016).

Ultisols are the main group of marginal soils found in the highlands of Indonesia (Prasetyo et al, 2001).Spodosols is a soil with low productivity and coarse texture (sand to loamy sand). The spread of spodosol soils in Indonesia covers the islands of Kalimantan, Sumatra, Sulawesi and Papua (Suharta and Yatno, 2009; Surianto et al. 2015).

The purpose of this study was to determine the concentration of magnesium in the components of *Eucalyptus pellita* F. Muell aged 1, 3, 5 and 13 years.

METHODS OF RESEARCH

This study was carried out in March 2020 in Industrial Plantation Forest, Sebulu District, Kutai Kartanegara Regency, East Kalimantan Province, Indonesia. The type of soil at the research site was Ultisols and Spodosols. *Eucalyptus pellita* F.muell aged 1, 3, and 5 years were at the Ultisols location, while the *Eucalyptus pellita* F.Muell aged 13 years was at the Spodosols location. Three research plots were made in the form of a circle each with an area of 0.05 ha and a radius of 12.6 m (Syahrinudin, 1997 and 2005; Mackensen, 1998). A total of 9 sample trees were determined (1 sample tree from each plot for *Eucalyptus pellita* F. Muell aged 1, 3, and 13 years), and 15 sample trees of *Eucalyptus pellita* F. Muell aged 5 years. For each sample tree, it was determined based on the distribution diameter at breast height (DBH), the data from the inventory of tree diameters were sorted from smallest to largest.

The tree component is divided into 10 equal parts of 10% each of the total length of the tree trunk in question. Samples of stem components were taken 5 cm thick (sample disks) at the base, middle, and top of the stem, namely 20%, 50% and 80% of the length of the stem from the base of the stem. The three stem components were then skinned. Furthermore, the wood and bark samples were brought to the laboratory into small pieces and dried at a temperature of 60℃ to constant weight.

All components of branches and twigs were collected in such a way according to their size and placement. All branches measuring < 2cm were categorized as twigs. Samples of branch and twig components were taken following the stem sampling procedure.

All leaf components were collected and then brought to the laboratory.

Nutrient analysis of Mg was carried out at the Laboratory of Soil Science, Faculty of Agriculture, University of Mulawarman. Analysis of magnesium used AAS.

The materials used in this study were components of *Eucalyptus pellita* F. Muell trees aged 1, 3, 5 and 13 years, namely stem components, wood branches + twigs, bark, branch bark +twig, leaves.

The tools used in this research include a meter, measuring tape (phiband), chainsaw, hanging scales, digital scales, plastic bags, neat ropes.

RESULTS AND DISCUSSION

The results of laboratory analysis on the average concentrations of Mg nutrients from the components of *Eucalyptus pellita* F. Muell trees aged 1, 3, 5 and 13 years are presented in Figure 1 and 2. They show the average concentration values of varied mean for each tree components and age group.

The average magnesium concentration in *Eucalyptus pellita* F. Muell stands at the age of 1 year (Figure 1) had the highest value in the leaf component (0.90 mg/g), followed by the bark component (0.57 mg/g), the branch bark + twig component (0.33 mg/g), stem wood (0.23 mg/g), while the lowest was in the branch + twig wood component (0.13 mg/g).

Figure 1 shows that at the age of 3 years, the highest average magnesium concentration was in the leaf component (1.10 mg/g), followed by the bark component (0.63 mg/g), the branch bark + twig component (0.40 mg/g), the wood component of branches + twigs (0.20 mg/g), while the lowest was in the component of the stem (0.17 mg/g).

The highest average magnesium concentration of the *E. pellita* stands aged 5 years as seen in Figure 1 was in the branch bark + twig component (4.48 mg/g), followed by the leaf component (3.10 mg/g), the bark component (2.31 mg/g), the wood branch + twig component (0.60 mg/g), while the lowest was in the stem component (0.43 mg/g).

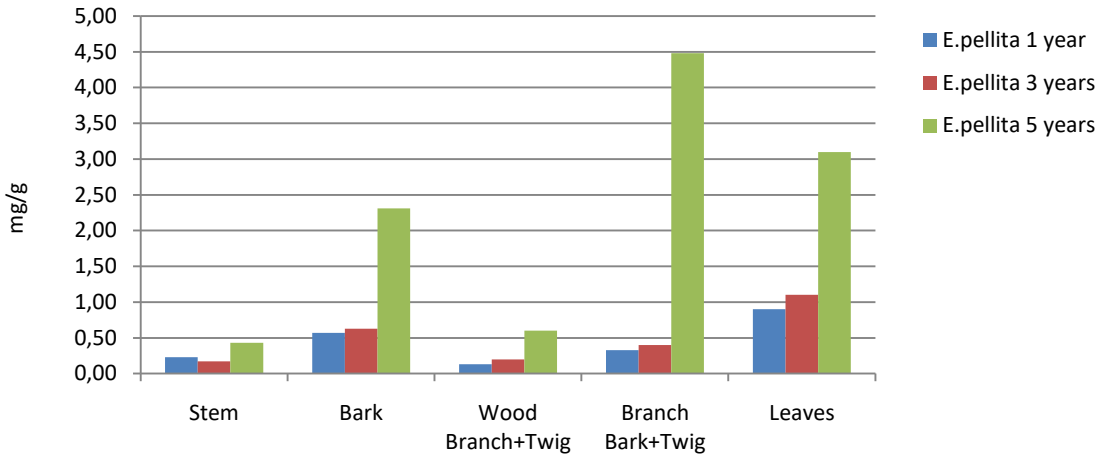

Figure 1 – Average concentration of nutrient Mg in the tree components of *Eucalyptus pellita* F. Muell aged 1,3 and 5 years at Ultisols

The highest average concentration of Mg in *E. pellita* stands aged 13 years (Figure 2) was in the leaf component (1.07 mg/g), followed by the bark component (0.70 mg/g), the branch bark component + twigs (0.57 mg/g), the stem wood component (0.23 mg/g), while the lowest was in the wood branch + twig component (0.17 mg/g).

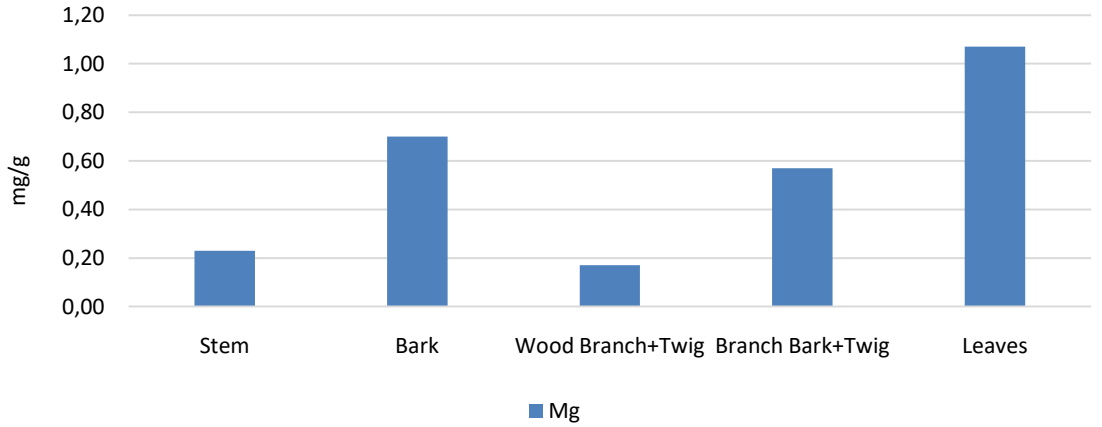

Figure 2 – Average concentration of nutrient Mg in the tree components of *Eucalyptus pellita* F. Muell aged 13 years at Spodosols

CONCLUSION

The highest concentration of Mg in *Eucalyptus pellita* F. Muell tree components aged 1 year was found in the leaf component (0.90 mg/g), while the lowest was in the wood branches + twigs (0.13 mg/g). At the age of 3 years, the highest concentration was in the leaf component (1.10 mg/g), while the lowest was in stem wood (0.17 mg/g). At the age of 5 years, the highest concentration of Mg was in branch bark + twigs (4.48 mg/g), while the lowest was in stem wood (0.43 mg/g). At the age of 13 years, the highest concentration of Magnesium was in the leaf component (1.07 mg/g), while the lowest average magnesium concentration was in the wood branch + twig component (0.17 mg/g). The difference in nutrient concentration was probably influenced by differences in age of stands and soil type.

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