Cultivation of *Pericopsis mooniana* Thw
Case Study: KHDTK Malili, Luwu Timur Regency

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**Abstract:** One of the local species of Sulawesi included in the IUCN redlist is kayu kuku (english: nedun wood) (*Pericopsis mooniana* Thw.). The status for this species is vulnerable of species in wildlife. This status will increase as the natural habitat of *P. mooniana* is threatened in the Lamedae Nature Reserve, Southeast Sulawesi. This activity aims to develop *P. mooniana* species by building a demonstration plot. location of activities in KHDTK Malili, Luwu Timur regency, South Sulawesi, which was held in 2017. The trial used a completely randomized design with singling and weeding treatments. The parameters observed were the height and diameter of the stem. The growth performance of the height and diameter of *P. mooniana* plants at the age of 24 months (2 years) showed a different response. The best increase in height was singling treatment with a mean height of 49.06 cm, while the best but not significant increase in diameter was control and weeding with a mean diameter of 4.42 and 3.64 mm. In general, *P. mooniana* can be developed exsitu and show potential growth using several silvicultural treatments.

1. **Introduction**
Sulawesi has many native tree species such as ebony [1], jabon merah [2], and kayu kuku (*Pericopsis mooniana* Thw.) from Fabaceae family [3]. Kayu kuku is also found in several regions such as Sumatra, Kalimantan and Papua, especially in Sulawesi which is only found in a limited area of the Lamedae Nature Reserve (NR). Another information to mention kayu kuku has a large area of distribution in many Southeast Asian countries [4]. Kayu kuku is one of the protected tree species. Population of kayu kuku was decreased by illegal trade, poor natural regeneration, and lack of replanting. Kayu kuku is listed in IUCN (*International Union for Conservation of Nature*) Red List under the category of vulnerable [3-4].

Cultivation is one of the strategy to overcome the threat of kayu kuku from land conversion and illegal logging [7]. Cultivation is carry out outside of conservation area. The objective of this study was to established plantation of kayu kuku for utilizing its wood and protect this species from extinction. In this paper, cultivation activities are limited to observing growth performance of kayu kuku by several seed sources. Singling (removal of less promising poles in multi-stem trees) and weeding is applied to plants for silvicultural treatments for the stability of planting. Generally, most community forest operational plans using those treatments [6-7]. However, there are currently no reports available about singling and weeding applications for this species [10]. The application of singling and weeding is expected to improve plant quality, both in performance and growth increment. Another information to know is the type of pests and diseases that attack nail wood at the initial growth.
2. Material and Methods
The study was conducted in the Forest Zone area with a Special Purpose (KHDTK) of Malili, part of the Larona Forest Management Unit, Malili District, Luwu Timur Regency, South Sulawesi. Altitude of ± 110 meters above sea level. The research material is two-year-old plantation tree with 60 selected trees.

![Figure 1. Location of Cultivation Plot (Source: BP2LHK Makassar)](image)

There are four sources of seed origin of the kayu kuku plants studied, which were CA. Lamedae, Petudua (Kolaka), Banjarbaru and Malili. The design used is completely randomized design. there are four blocks (according to the source of the seed). Each block has three observation plots (replication), so that the total plot is 12 plots. Each plot contains 5 plant units. Total plants observed were 60 plant units. Silvicultural treatments are used i.e singling and weeding. The parameter observed were growth increment (height in m dan diameter in cm) using caliper and height gauge, and information about pests and diseases. Data analysis was performed using SPSS Statistic 16.0. The conditions for ex-situ conservation are not used in this activity, such as planting area (ha), number of plants, and blocking system.
The initial phase of the activity is checking the condition of the plot. Then determine which plants will be observed for growth. Further, build an Observation Plot by giving a mark. Then singling and weeding using pruning shears (treatment). Initial measurements were made before treatment (preliminary data). Furthermore, growth measurements and observations were made nine months after treatment (final data).

3. Result and Discussion

3.1. Effect of singling dan weedling

Figure 1 shows height and diameter increment of three treatment methods (singling, weeding, and control). Plants respond well when given singling compared to the control and weeding. The mean height increment in the plot was 49.06 cm. Among the treatment, greater increment showed by material from Malili (61.11 cm), and smaller increment was 40.57 cm by material from Lamedae.

Regarding the improvement of the height, data from the diameter shows opposite trend. On average, singling treatment obtained smallest diameter increment (2.85 mm). Whereas previously known that singling better than other treatment about height increment. Mean of height increment between singling and control were significantly different, but between singling and weeding showed no significant differences. Control and Weeding treatment showed no significant differences in diameter increment. The best of diameter increment was control treatment with the mean growth was 4.42 mm (figure 3).
Singling activities more focused on the efficiency of food distribution plant to a certain section. The efficiency of these foods not diminish, but suppress wasteful by eliminating the negative part [11]. Singling activities provided have an influence on plant height. Trimmed plant parts are the less good parts such as shaded leaves or branches that are no longer productive.

The omitted portion might be only absorb food sources and do not contribute to the provision of food for plant growth. Removal of several branches increases the growth rate of the remaining branches [12]. So, the singling plants tend to have good apical growth. But unfortunately, the singling treatment actually suppresses the lateral growth of plants. As a result, the plant height is increase fast but is not supported by a good increase in the plant diameter.

The plant with control and weeding treatment obtained diameter increment better than singling. Plants that are singling tend to have stem curvature because they are not supported by solid stems. So that, violates the purpose of singling to correct potential deviation of stems from a pathway of vertical growth [13]. This condition is different from weeding and control plants which are more stable to the strength of plant stems. These results show the importance of applying appropriate singling. Faulty singling treatments can impede the growth, production, and quality of wood [14]. Singling time at the age of two years on kayu kuku is not sufficient to balance the growth of height and diameter of plants.

3.2. Pest and disease symptoms
Based on observation, pests that attack are caterpillars. Usually caterpillars hide in curled or leaflets between the leaves [15]. So it is difficult to detect it. Infestation attacks are still low, and did not cause the death of the plant, only a stunted plant growth. The indicator of attack is that some plants dry out and the leaves fall on the branches or shoots. Further observation is the presence of wounds at the branching points, holes, flaky skin, and some looked produce sticky powder around the plant wound. At the level of severe infestation, the plant will shed all its leaves because the attack is concentrated on the base of the plant. Many plants, especially perennials, can tolerate damage to large leaves, so some leaf-eating caterpillars often not a problem [15], but if this condition but let the conditions continue, it will lead to the possibility of the quality of the wood.
Figure 4. Examples of Pests that Attack Kayu Kuku Plants

4. Conclusion
Singling can promote height growth of kayu kuku but is not comparable by growth in diameter. There are no differences between weeding and control treatment to height and diameter increment, but its show good stability in the strength of the stem. Needed more intensive observation of the applied silvicultural treatment for accurate information. The types of pests that attack the planting site are caterpillars.

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