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Characteristics of sengon (*Paraserianthes falcataria)* stands in forest Blitar

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Abstract— *Paraserianthes falcataria (sengon) Family of Fabaceae that grows in East Java province based on observations in the field, these plants show the potential to accelerate the process of soil fertility. Character of shape, morphology and intensity of sunlight that is required by sengon stand for the process of soil enrichment in the forest, is not known for certain. This research is carried out to determine the symptoms of morphological characters, sengon tree as a contributor to the process of soil fertility. Dependence intensity of sunlight for sengon is still needed every season. Plant morphology can be from various literature while characterization observed by observation method such as light intensity, irradiation time, field height whereas sengon stand include, number of branches, width of crown, number of canopy, tree height and tree age. There are 9 types of Sengon varieties in East Java, especially shade Blitar. That k value is 490 and a value is -0,10. Sunlight intensity reach highest on 12 am which is 90% on IV age tree and lowest sengon on 12 am on V age tree is 46%*

Keywords— Intensity, Fertility, Varieties, Stands, Age.

I. INTRODUCTION

The height of industrial wood demand and to preserve stability of raw material availability so that need of industrial wood remain available, encourage government participating and developing state forest in Java island to become sengon wood. Sengon which has characteristic of fast growing is easily adept in every soil condition. Its good silviculture characteristic, its wood quality that still accepted forpanel industry and carpentry, also its selling price that quite profitable make sengod wood market still stand until today. Sengon(*Paraserianthes falcataria*) is one kind of all-purposed forest plant and being developed until today because it is very important in fulfilling the need of industrial wood production. This variety is chosen to fulfill need in Indonesia because its growth fast. Sengon spreading area is quite vast, from Sumatera, Java, Bali, Flores and Maluku (Department of Agriculture , 2013) The fulfillment of wood production is still lacking and the development of fast growing wood in Indonesia, such as, mangium (*Acacia mangium*), sengon (*Paraserianthes falcataria*), jabon (*Antocephalus cadamba*) and another varieties, theirquality were able improved (Krisnawati, 2011), the Sengon (*Paraserianthes falcataria)* choice as multipurpose plant on critical land area and forest area is appropriate because sengon is a fast growing plant, that has fast growth, short harvest period, easy cultivation technique, high productivity, multipurpose and give double effects both as production plants and production plant conservation because its wood served as multipurpose necessity, conservation plant, because sengon has tap root that quite strong to penetrate into soil with its root hair which has a function to keep nitrogen so it makes soil around sengon tree become fertile (Ogata, 2008). Until recently, Indonesian generally still used seed in sengon cultivation; generative cultivation, it is a mini plant (embryo) that still in state of delay in growth (IAWA, 2008). Therefore, the election of tree which has good morphology can also generate seed which has good characteristic. It can improve success rate in next seedling cultivation. Seeing big potential of sengon, the writer intends to know the characteristic of sengon stand in state forest by considering several aspects such as; area elevation, slopes, sunlight intensity from one plant forest areal, that is property of Perum Perhutani Blitar.

II. MATERIALS AND METHODS

Material that is used in this research is sengon stand which is five years old with 3x3 meters planting distant. Tools that are used in this research such as, machete, hoe, *lux meter DX 100, thermo hygrometer,* compass, measuring tape, *hagahypsometer,* raffia string, digital camera, and stationary. *Purposive sampling* is used as research method. Research is done for four months started on February until April 2017, in KPH Blitar – East Java. Observation was focused on sengon's morphology and characteristic. Data which will be collected is primary and secondary. Primary data collection process is collected through direct measurement in the field such as tree height measurement, trunk diameter, tree canopy measurement, sunlight intensity measurement on each sengon stand and lane

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stand, planting distance, temperature measurement also humidity. The required secondary data is profile data from research location such as; genetic dendrogram data, position and width data, land usage pattern, topography and climate condition. This data are obtained from literature reviev

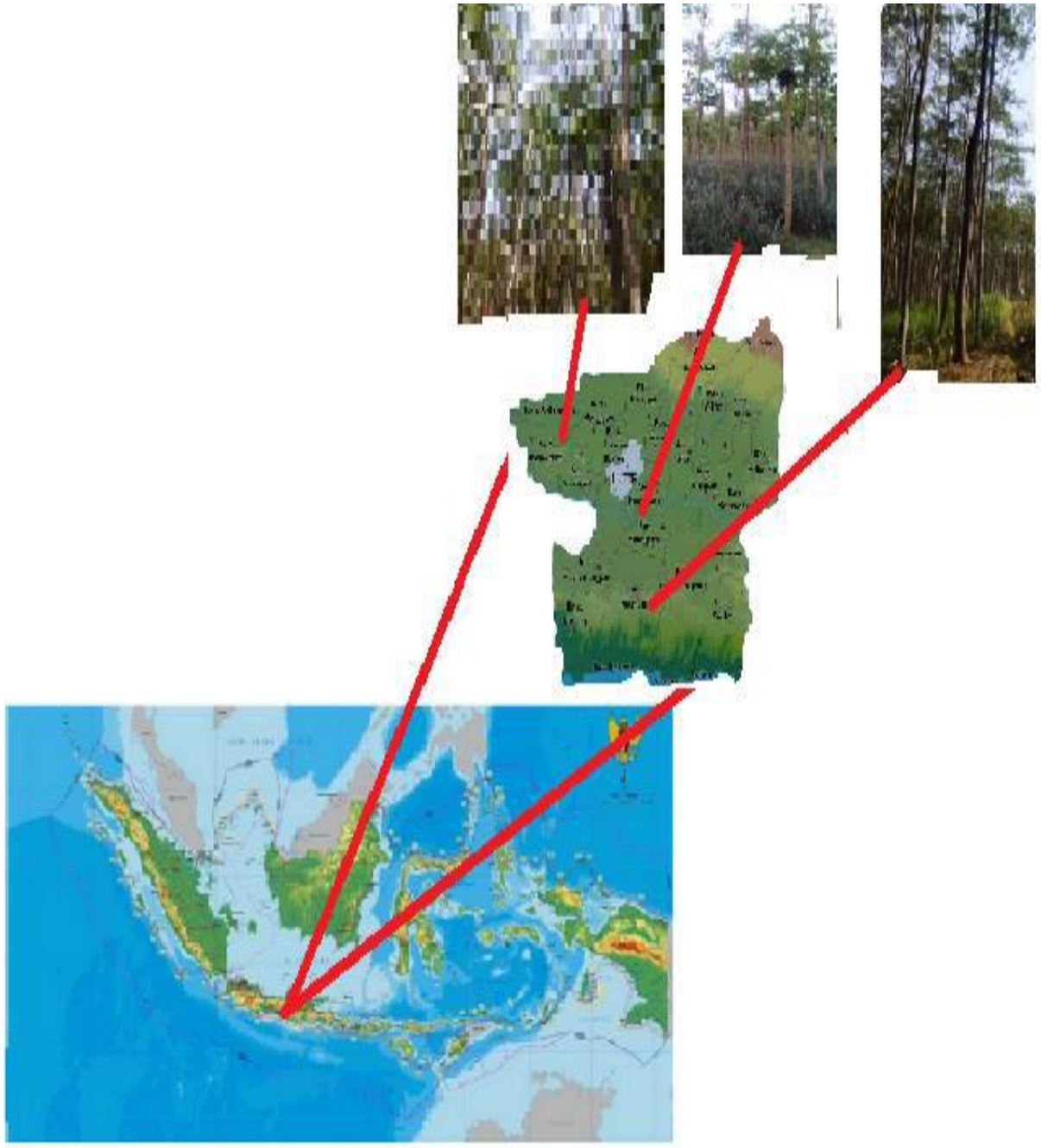

Fig.1: Sampling site forest area Blitar, East Java

III. RESULT AND DISCUSSION

3.1 Sengon Stand's Characteristic through Poison Curve Approach

Sengon tree that managed by PerumPerhutani has different age variety, from I class diameter, II class diameter, III class diameter, IV class diameter, V class diameter. From calculation result it can be known that *k* value is 490 and *a* value is -0,10. The value Constanta of *k* illustrate that sengon stand in KPH Blitar is dominated by small diameter trees. Minus (-) value on *a*variable is a negative slope signed that trees quantity is inversely proportional with class diameter increase. After *k* and *a* values are discovered.

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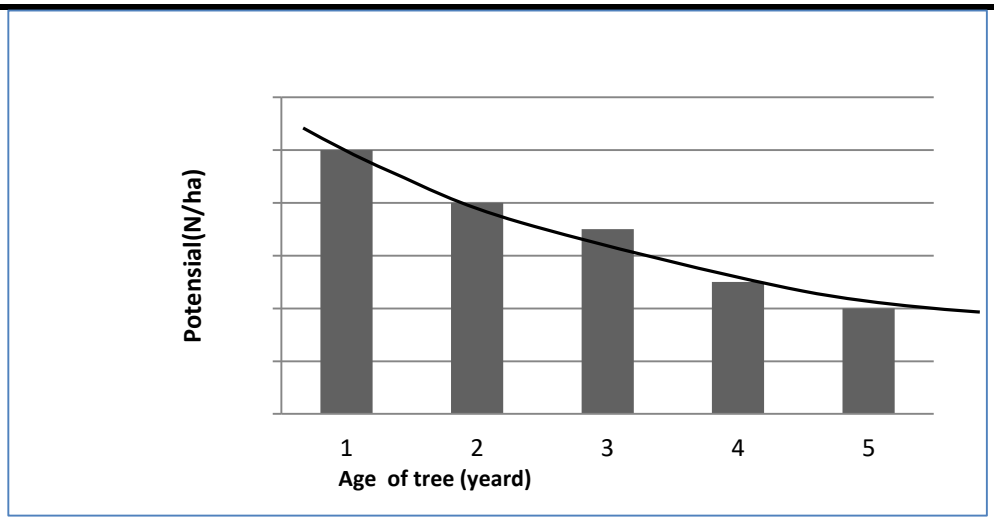

Fig.2: Curve of relation between trees quantity per hectare with class diameter

That stand structure on forest sengon in KPH Blitar generally describe normal distribution of even-aged forest stand Those characteristic resemble stand characteristic on natural forest. That allometric model has determination coefficient 85% which means 85% of trees quantity diversity can be explained by diameter well (Bustom, 1995)

3.2 Sengon Stand Characteristic Based On Altitude Factor and Land Slope Factor

Based on altitude factor, land slope, that on height of 30-170 mdpl, tree quantity on every class diameter shows increase trend from I class diameter to V class diameter. On 0-5% slope and 5-10% slope, quantity of trees on every class diameter is also showing increase trend from I class diameter to V class diameter. The relationship between altitudes, land slope toward sengon stand availability on KPH Blitar can be seen on Table 1

Table.1: Biophysical condition on the fourth type of agroforestry

No	Type Agroforestry	age/ yerd	Coordinates (latitude/ Longitude)	Altitude	The Slope of the land	Lihgt intensity(Lux)
1	Paraserianthes and rice	2	7°58'-"8°9'51"LS / 111°40'- 112°10'"BT	169	6%	86-96%
2	Paraserianthes and crown	3	7°58'-"8°9'51"LS / 111°40'- 112°10'"BT	167	3%	83-91%
3	Paraserianthes and pineapple	4	7°58'-"8°9'51"LS / 111°40'- 112°10'"BT	167	3%	90-95%
4	Paraserianthes and gress	5	7°58'-"8°9'51"LS / 111°40'- 112°10'"BT	167	5%	46-58%

3.3 Sunlight Intensity and Canopy Closure

Plant photosynthesis process needs sunlight. A good photosynthesis process influence plant to grow well (Finkeldey. 2005). Sunlight illumination period on soil surface will also influence staple plant growth and plant which grow below stand. Sunlight intensity frequency that continued to soil surface will tend to decrease along with plant's age increase. Result from canopy closure percentage measurement and magnitude of sunlight intensity on plot of green sengon and plus example can be seen on Figur 3.

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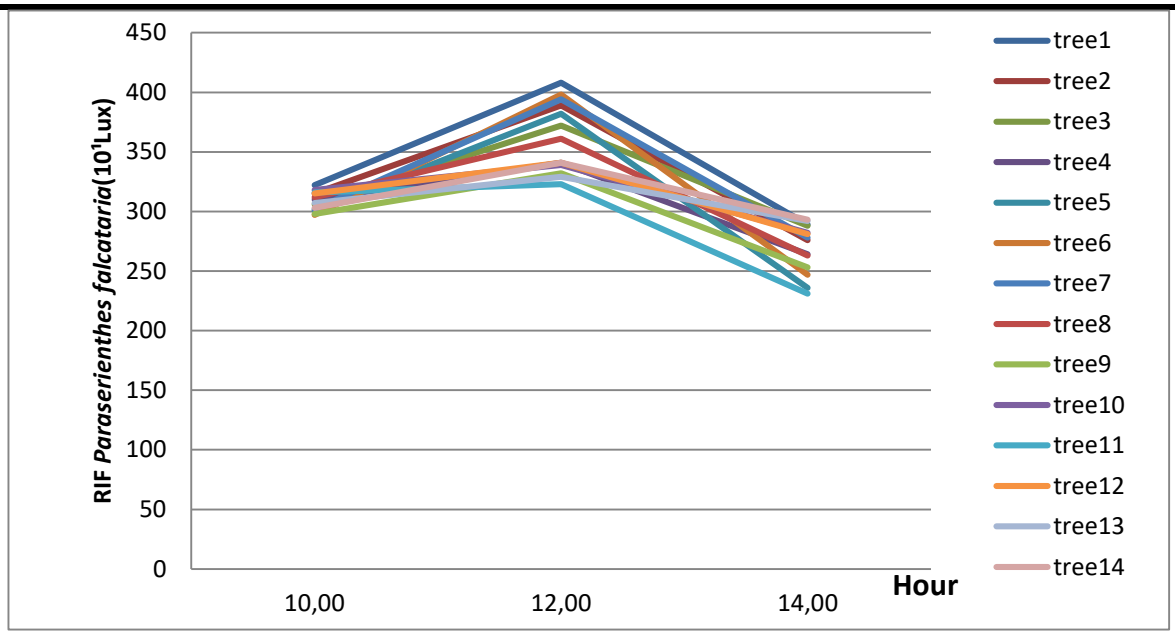

Fig.3: Average graph of light intensity (10^1lux)

Sunlight intensity average and canopy closure percentage on plot of green sengon and plus. From the measurement result on research location can be defined that magnitude of sunlight intensity reach highest on 12 am which is 90% on IV age tree and lowest sengon on 12 am on V age tree is 46%. That sunlight intensity magnitude on sengon stand can't be compare. It is because the difference on measurement time.From that result, it shows that on the morning sunlight intensity is increase and the highest sunlight intensity happen on the daytime. On the evening sunlight intensity is decrease. Sunlight intensity on sengon stand show highest sunlight intensity happen on 12 am. According to Kinimouth (1986), sunlight radiation acceptance on surface of the earth varied according to place and time. According to place especially caused by the difference of latitude position also atmosphere condition especially the cloud. On micro scale, slope direction strongly determines the amount of accepted radiation. According time, radiation difference in a day (morning to evening) or seasonal (from day to day). Beside the factors above, another factor that influence sunlight intensity magnitude is tree canopy closure. Magnitude percentage of five years old tree canopy closure is 45%. On green sengon tree, canopy closure percentage value is quite sparse because it has less than 40% canopy closure (Linhart, 2008). Low sunlight intensity that caused by too dense shade for plant that need sunlight (intolerant) will cause etiolation. While too much sunlight intensity will cause interference on plant growth even it will cause death for tolerant plant (Hill, 2006).

3.4 Structure of Wood Anatomy and Fiber Morphology

Research finding shows that sengon wood that is researched has microscopic characteristic as follows; terrace part is brown grayish, wood surface is dim less shiny; touch impression is a bit rough and quite coarse; texture is a bit rough to rough evenly; fiber line is strict to a bit chime; soft to a bit hard; and tanner substance odor is less strong. Average proportion is 80%.This amount is far smaller than proportion of hard wood part on the sengon tree, which reaches up to 84% (Wahyudi 2011). As well as touch impression, shine, hardness, and wood odor which all of that different compare to old sengon tree. Sengon wood surface that researched is a bit rough to rough evenly, coarse, dim and less shiny, soft and has weak odor. Only its wood texture and fiber line that is equal with old sengon tree.This is also supported by measurement result of its physics and mechanics characteristic. Old sengon tree has characteristics such as; a very clear grow diameter limit, parenchyma has strict limit in shape of wide concentric ribbons, wood surface is smooth and waxy, shiny, hard and has unique odor similar to skin tanner substance. Wood color aspect, artery cell, parenchyma limit and spiral thickening, superior sengon tree that researched is also different than old sengon tree (Hariis, 1986). On the old sengon tree, its terrace part is dark brown to golden brown, pores arrange on circle pattern, it has thick tilosis (skleroid) and there is white yellowish sediment. Parenchyma limit shapes like concentric thick ribbons and spiral thickening on inside fiber cell is rarely find out (Damayanti, 2011). Lack of extractive substance and colorful sediment indicates that wood that researched is classified as less durable because except fiber length, fiber wall thick, touch impression, and wood hardness. The smooth wood surface to a bit coarse and wood is classified as a bit hard.

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IV. CONCLUSION

Based on research finding, it can be concluded that sengon wood on 4 and 5 years old that are researched should be improved its quality because its characteristics and its basic traits in general are lower than similar characteristics and traits that can be found on old sengon tree. Forest stand on KPH Blitar with determination coefficient 85%. It shows that sengon forest stand characteristic on KPH Blitar still shows its normal characteristic on even-aged forest. Altitude factor, slope is significantly influence toward stand availability. This closely relate to different condition of in between diameter class management.

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