DISTRIBUTION AND ANALYSIS OFTAXUS SUMATRANAVEGETATION IN KERINCI NATIONAL PARK, INDONESIA

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DISTRIBUTION AND ANALYSIS OF *TAXUS SUMATRANA* VEGETATION IN KERINCI NATIONAL PARK, INDONESIA

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Abstract

This study aims at scrutinizing distribution of *Taxus sumatrana* together with the surrounding habitat. Data were gained using Global Positioning System(GPS), Phiben, and software ArcGis 10.2. The primary data included the location of *Taxus sumatrana* distribution at the site, and vegetation structure surrounding the Taxus's habitat. Next, the line transect method, as well as purposive random sampling, were applied for vegetation analysis. Distribution was analyzed using Microsoft Excel and ArcGis 10.2, and importance value index was calculated for surrounding vegetation. The result indicated that there are 234 species of *Taxus sumatrana* with 11 seedlings, 13 saplings, 33 poles and 177 tresses in the location. The most number of *Taxus sumatrana* was found in the mid-montane forest (1.900-2.400 M average of the sea level) with 31 species of the surrounding vegetation. The highest of importance value index for tree species is *Schima wallichii*, while for poles species, the highest of importance value index is *Syzygium lineatum*.

Key words: distribution, analysis vegetation, *Taxus sumatrana*, Mount Kerinci, Indonesia

Introduction

Kerinci Seblat National Park (*hereinafter will be called KSNP*) in Indonesia has a high potential for biodiversity. The biodiversity has both identified and unidentified. *KSNP* has also got fauna of 85 species mammal. Moreover, potential flora in the forest area of *KSNP* has reached more than 4000 species of plant, consist of tree species, with 63 families. They are dominated by *Dipterocarpaceae, Burseraceae, Lauraceae, Meliaceae, Myrtaceae, Leguminosae, Euphorbiaceae, Moraceae, Anacardiaceae* and *Myristicaceae* as well as 300 orchid species.

Other species which include specific vegetation *KSNP* are *Amorphophallus titanum* and various *Nepenthes*, *Raflessia* as well as *Edelweiss*. There are also some plants with rare and unique categories, such as *Harpulia Arborea*, *Pinus merkusii*. In addition, there are also some endemic plants in *KSNP*. One of the endemic plants in the forest area of *KSNP* is *Taxus sumatrana* (*hereinafter will be called TS*) which is useful as medicine (Hidayat, Rahmat & Subiakto, 2008).

Convention and International Trade in Endangered Species (CITES) institutions states that plants of *Taxus* are categorized in CITES (CITES, 2005). Population *Taxus*, worldwide, has declined drastically along with the high level of exploitation. Besides, the distribution of *TS* in *KSNP* has never been calculated. Related to the issues, this research was conducted to know the delivery as well as to analyze vegetation of *TS* in *KSNP*.

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Materials and Methods

As stated before, this research was conducted in *KSNP*. Data were gained using Global Positioning System(GPS), Phiben, and software ArcGis 10.2. The primary data included the location of *Taxus sumatrana* distribution at the site and vegetation structure surrounding the Taxus's habitat. Next, the line transect method, as well as purposive random sampling, were applied for vegetation analysis. Distribution was analyzed using Microsoft Excel and ArcGis 10.2 (Bismark, 2010). Eighty-five plots were determined. The determination was conducted using purposive random sampling sized 20x20 meters for trees, 10×10 m for poles, 5×5m for saplings (stake) and 2×2m for seedlings. The distance between plots was 20 meters.

Data recorded for trees and poles were type species,

number of individuals, and diameters and high trees. Data analysis of *TS* distribution was conducted by transferring coordinate data, which has been taken via GPS, into a computer, namely in Microsoft Excel format.

After the data has been formatted in excel format, then the data was processed using the application of *ArcGIS* 10.2. Furthermore, it is transformed into distribution data in the distribution map of *TS*. The data of *TS* was also gained utilising the measurement of the height, and the type of forest. The following figure is the placement of research sample plots.

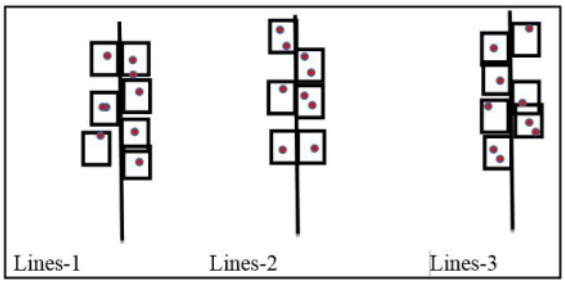

Fig. 1: Placement of sample plots in three lines.

Next, data of *TS* findings were calculated and grouped based on the rate of growing seedlings, stake, poles and trees. Structure vegetation was then analyzed by calculating the value of frequency, density, dominance and Important Value Index (Soerianegara & Indrawan 2008).

Results and Discussion

The number of *TS* found in three lanes research is 234. The recapitulation on each path is presented in the following figures Fig. 2 & Fig. 3.

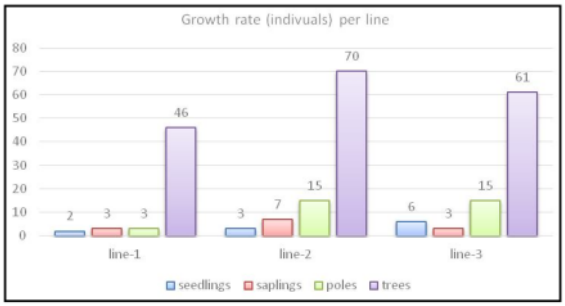

Fig. 2: The number of *TS* based on three lanes survey.

Based on Figure two and three above, it is stated that the number of seedlings is less than the number of sampling poles and trees. It is caused by the intensity of light received by the forest floor. According to Frianto (2016), the very low light intensity affect the difficulty seeds of germinating. Furthermore, Chybicky *et al.*, (2011) and Frianto (2016) state that high plant density

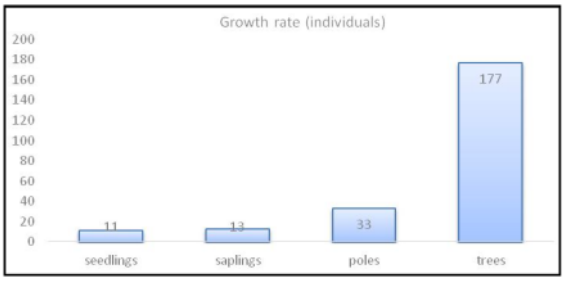

Fig. 3: The total amount of *TS* based on the growth rate.

causes the forest floor to darken, so the seed will be difficult to germinate.

Pilz (1996) and Hendalastuti *et al.*, (2010) state that *TS* requires at least 12-18 months for stratification. Another factor that causes a little discovery seedling is related to the type of *Taxus disease* of *TS* (Rachmat, 2008). Next, the result of this study shows that the *TS* found, on average, are hight 1.653 M asl to 2.515 m asl. In line one, *TS* is found at high 1.989 m asl up to 2.476 m asl. In line two, *TS* is found at high 1.887 m asl up to 2.511 m asl. Next, in line three, *TS* is located at top 1.653 m asl pl up to 2.512 m asl.

TS grow scattered starting from the Westside to the Eastside in *KSNP*. Based on the height of the places of *TS*, it is found that most of them are at altitude 1.900 to 2.400 m asl. Based on the type of forest that has been divided by Laumonier (1994), KNP is included at the kind of mid montane forest. Based on the height, Laumonier (1994) divides forest of *KSNP* become seven forest types, namely (1) lowland forest (<300 m asl), (2) hill forest (300-800 m asl), (3) submontane forest (800 to 1.400 m asl), (4) lower montane forest (1.400-1.900 m asl), (5) submontane forest (1.900-2.400 m asl), (6) upper montane forest (2.400-2.900 m asl) and (7) tropical sub-Alpin (2.900-3.400 m asl).

Distribution of *TS* spread is dominated in the group of the montane forest. According to Ludwig and Reynolds (1988), Odum (1996), and Indriyanto (2006), in general, there are three patterns of natural distribution, i.e. random, uniform, and cluster. According to the type, the *TS* distribution is a clustered pattern. The statements are based on the result presented in the following table.

Based on the hight of the place of *TS* growing distribution, it is found that the *TS* grow mostly in the montane forest at an altitude 1.400 to 2.900 m.asl. This finding is in accordance with the results research conducted by Spjut (2003) and Hendalastuti (2008), which state that *TS* grow in Indonesia at height 1.400 to 2.800 m asl. Moreover, following the reported Pasaribu & Setyawati (2010) which found *TS* at height 1.800 to 2.200

m asl, that is on Mount Dempo South Sumatra, Indonesia. The distribution of *TS,* based on its spatial growth rate, is presented in Fig. 4 below.

Important Values (IV) and Density of TS

Result analysis of structure vegetation *TS* for the level of the trees' Values Frequency Relative (FR) is 17,70%, Density Relative (KR) is 16,02%, Dominance Relative (DR) is 34,13% and IV is 67,86%. It shows that *TS* has the most number of encounters, has a lot of plot found, and a large diameter. For poles, the FR is 7,33%, KR is, 53%, Dris 8,74% and IV is 24,60%. The density of *TS* tree is 32,05 per ha. It is higher than the results of the study conducted by Frianto (2016) which obtain the density of *TS* in a location of 10,19 tree/ha, and poles with a density of 34,11 per ha.

Table 1: Distribution of *TS* based on the type of forest in *KSNP.*

Hight (meter average sea level)	Forest Type	Number of *TS* (individual)
< 300 m. Asl	*lowland forest*	0
300-800 m. Asl	*hill forest*	0
800 to 1.400 m. Asl	*sub montane forest*	0
1.400-1.900 m. Asl	*lower montane forest*	14
1.900-2.400 m. Asl	*mid montane forest*	207
2.400-2.900 m. Asl	*upper montane forest*	13
2.900-3.400 m. Asl	*tropical subalpine*	0
→3400	*no vegetation*	0

Conclusion

Base on the results and discussion, as presented previously, it is concluded two main things. First, the distribution of *TS KSNP* starts at 1.653 m asl to 2.515 m asl. The total *TS* found is 234 tress that distributed in three forest types namely Lower Montane Forest (14 Trees), Sub Montane Forest (207 Trees) and Upper Montane Forest (13 Trees). Second, the density of *TS* trees is 32 per ha, with IV as much as 67,86% and for poles, 34 per ha. Furthermore, IV is 24,60%.

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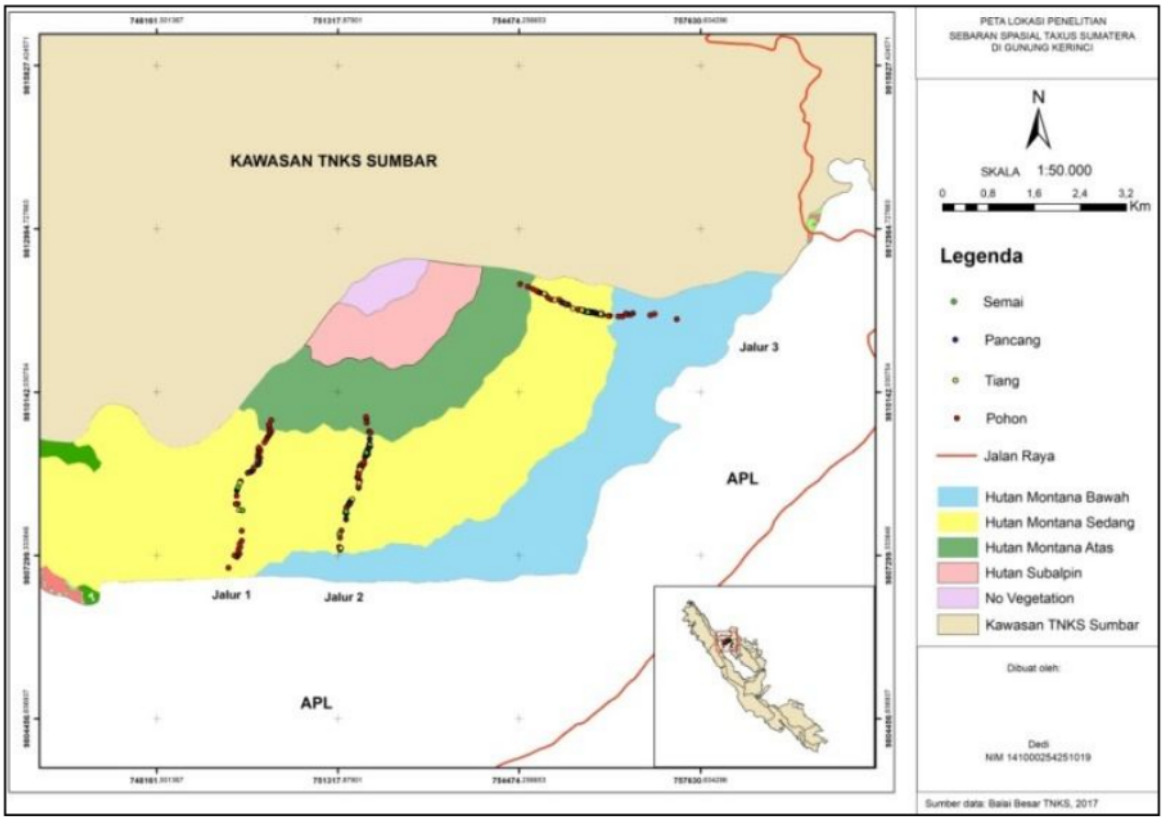

Fig. 4: Map distribution of *TS* based on forest type and growth rate.

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