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Observation of Rubber Plantation Land as an Integration of Animal Feed In Kemiri Village, Panti Sub-District, Jember District, East Java Province, Indonesia

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Abstract

The purpose of this study was to determine the population of dominance plant species (%), and as information for the conservation of land areas to increase the availability of animal feed in Kemiri village, Jember district, East Java. The number of plant species as animal feed was 22, consist of 12 types of grass, six types of legumes, and four types of weeds. The population of grass species more than 75% consisted of *Axonopus compessus* (85.71%), *Para grass* (82.14%), *Bracharia decumben* (75.00%), *Kyllinga brevifolia* (75.00%), and clover was *Centrosema Molle* (78.57%). The comparison between plant species consists of grass 57.77%, legumes 22.31%, and weeds 19.92%. The frequent observation of plant height is 19.08 cm, plant cover power is 66%. The findings of this study suggest that *Axonopus compessus*, *Para grass*, *Bracharia decumben*, *Kyllinga brevifolia*, and *Centrosema molle* are dominance of plant species could increase production, and in these case could used for development and conservation of availability to increase of animal feed supplies.

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Keywords

Appearance frequency, Plant height (cm), Population of plant (%), Animal feed.

Introduction

The level of ecosystem regulation depends on plant species in the area. The management on grassland areas has a significant impact on the nature conservation and landscape integrity. The livestock production is dependent on both plant species and genetic diversity of a grazing area. The variety of the population of plant ecology outside of animal feed production includes recycling of nutrients, climate change, and detoxification of hazardous chemicals (Altieri, 1994). The community of plant species it has an essential role in the life cycle of plants and animals. Feed supplies for livestock depend on grasslands, and grass species to produce more preferred types quantity and quality. At the same time, the balance of the grass ecosystem and enrichment of soil nutrients from manure can be used as fertilizer for grass. In various pastures, and the integration of the use of forage resources by herbivores does not always coincide with vegetation or phytosociological units of plant species. Because of their complexity, plant-animal interactions are considered in various processes that occur at different spatial and temporal scales (Astigaraga, 2002).

To determine a grazing area should be supported by the availability of feed, especially in the heterogeneous environments between plant species and cattle. In medium intensity farming areas, the productivity of grazing areas requires management for biodiversity consistent and development conservation. The supply of forage as cattle depends on pastures, and it produces a

wide variety of grass species which are superior in quantity and quality. At the same time, grass ecosystem balance and soil nutrient enrichment from their feces can be used as fertilizer for soil on the grazing area. Natural fertilization and transport of nutrients in animal's excreta is also significant for fertilizer of forage and adjacent biocenosis which may be used by herbivores for feeding and resting. It may be assumed that wild plants are adaptable to herbivores since plant species evolved together. Determination plant species of cattle feed in rubber plantation land based on the appearance frequency and abundance of plant species that gives animal's decision of what and how much to eat under conditions where are widely controlled plant species as cattle feed. The choice test has frequently used in ecological research (McMahon, 2010), but fewer have been used to obtain new insights into the aspect of ruminant nutrients of rubber plantation land.

The objective of this study was to identify the species diversity and determine the dominant plant species in the studied rubber plantation land to supply animal feeds. The important spatial levels (patch and feeding station), and selective grazing that are influenced by preferred species and nutritive values of plants (Dumont, 2000) are considered. Qualitative and structural factors, such as nutrient contents, digestibility, and plant morphology interact with the choice of animals (Gordon, 1997; Rook, 2002) and their behavior (Meisser, 2014) are discussed. The relationships of the appearance frequency of various species to have impacts on plant community, chlorophyll, vegetation cover rate, and species number between spring and summer seasons are also determined.

Materials and Methods

Study area

This study was conducted at the rubber plantation in Kemiri village, Panti sub-district, Jember district, East Java Province, Indonesia. The topography of the Panti area, Jember district varies from an altitude of 50 m to 1,340 m from the sea level with the slope condition beingincreasingly towards the south. Most of the settlements are in the lowlands with an altitude of 50 to 140 m (Priyati, 2009) (Fig. 1).

Vegetation analysis

Identification of species composition was conducted 2018 following method Braun-Blanquet scale was used to determine the adaptation of plant species. Assessment of dominant plant species was determined by comparing the abundance and appearance of dominant plant species. The phytosociological attributes of plant species were studied by using a line transect of 0-100 m at every 10 m interval. Specimens of each plant species were recorded in a plot with an area of 1 × 1 m quadrate (n = 11). Of which, one-meter square makes 16 parts of 0.25 × 0.25 m sub-quadrate (Braun-Blanquet, 1964).

Data analysis

The vegetation data were quantitatively analyzed for density, frequency, and abundance as described in (Braun-Blanquet, 1964). Data were analyzed to determine the appearance population of various species (%), plant height (cm), vegetation cover rate (%) computed following a method of reporting in (Simpson, 1949). The relative frequency of these parameters was calculated as noted in (Philips, 1959).

Results and Discussions

Diversity frequency of Various Plant Species

Grass, clover, and weed species frequency is one characteristic of functional species group community. It is a mechanism for generating stability. The nature of the plant community at a place is determined by species to grow and develop in such an environment (Bliss, 1962). In general, abundance frequency of the appearance of various species in the observation was 145 grass, 56 clovers, and 50 weed (Table 1).

The maximum occurrence of species could increase the productivity of plant species, due to the availability of moisture provided by rains and other environmental factors. A similar pattern of observations mirrored to present study was also mentioned by (Sharma, 2012). In the rubber plantation land, grass is high if compare than clover and weed, because grass could adapt in plantation land, it is mean grass could use for cattle feed.

Some of the plant species were decreased, therefore in this case, the absorption and supplementation of nutrients can be increased according to the frequency of the appearance of species that conserve and breed grass in the plantation land. At moderate densities, the degree of discrimination among plant species may be slightly reduced, but it was increased in total amounts of tissue removal per plant composition due to selective foraging (Marquis, 1981; Tilghman, 1989; Brown, 1993). Alteration of grazing regimes affect the abundance of

plant species (Mudler, 1989; Hester, 2008), but mechanisms of plant responses to plant morphological and physiological traits, are often not explicitly quantified.

Dominance of appearance frequency species from Table 1 more than 75% consisted of *Axonopus compessus* (85.71%), *Para grass* (82.14%), *Bracharia decumben* (75.00%), *Kyllinga brevifolia* (75.00%), and clover was *Centrosema molle* (78.57%) among various species to grazer (i.e. grazing resistant species) influenced to the productivity of species. The frequency of multiple species can increase the productivity of plantspecies in rubber plantation land as the integration of animal feed in Kemiri village, Jember Regency, East Java. The high-frequency plant species are important to predict the combination of traits that are typical to short grass increasing in abundance.When the grazing pressurewas enhanced, tall grass is decreased, and the tolerance ration to weed, grass, and clover can set for management to community structure and taxonomy, phylogenetic, and functional across plant species.

Community height

Community height of diversity plant species shows in Figure 2. Ranging from 11.44 cm to 29.00 cm, with an average plant height of 19.08 cm. The population distribution of plant density, cover, biomass per unit area and plant height, isused to measure the biological abundance of vegetation dominance, species composition and spatial patterns of vegetation in different plant communities (Chen *et al.*, 2008). Research hasshown that plant height affects species diversity, spatialheterogeneity, and vegetation structure (Metzger, 2004). The stronger photosynthesis may positively increase plant growth. Plant height depends on different kind of plant species presenting in rubber plantation land; thus the management and production of plant height are essential to increase the abundance of plant species for animal feed. The frequency distribution of density, cover, and biomass of plants as well as plant height are commonly used as indicators to describe species composition and spatial patterns of vegetation in different plant communities (Chen, 2008). Species that are either tolerated or adapted to grazing (e.g., low palatability, adapted growth form) can react with compensatory growth, or even increasing productivity (McNaughton, 1983), and they are thus favored.

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Figure.1 The study area at Kemiri Village, Panti Sub-District, Jember District, East Java Province, Indonesia

Figure.2 Community height of plant species (cm)

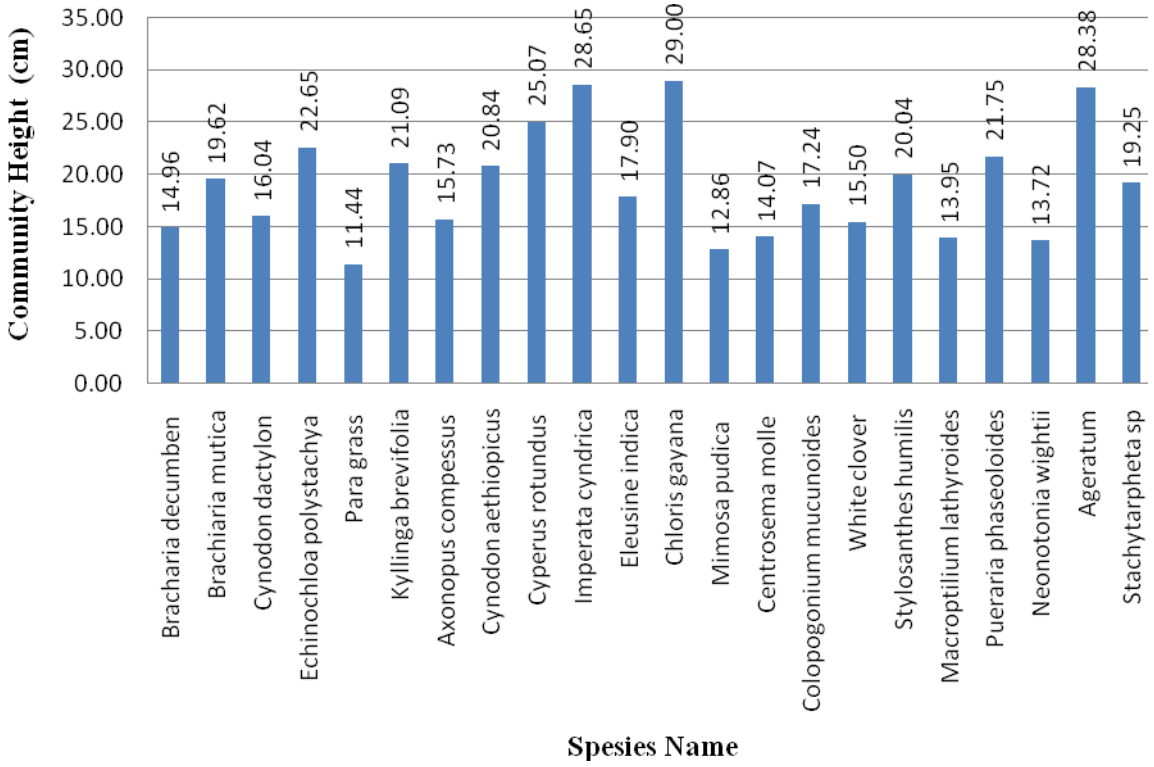

Figure.3 Community height of plant species (cm)

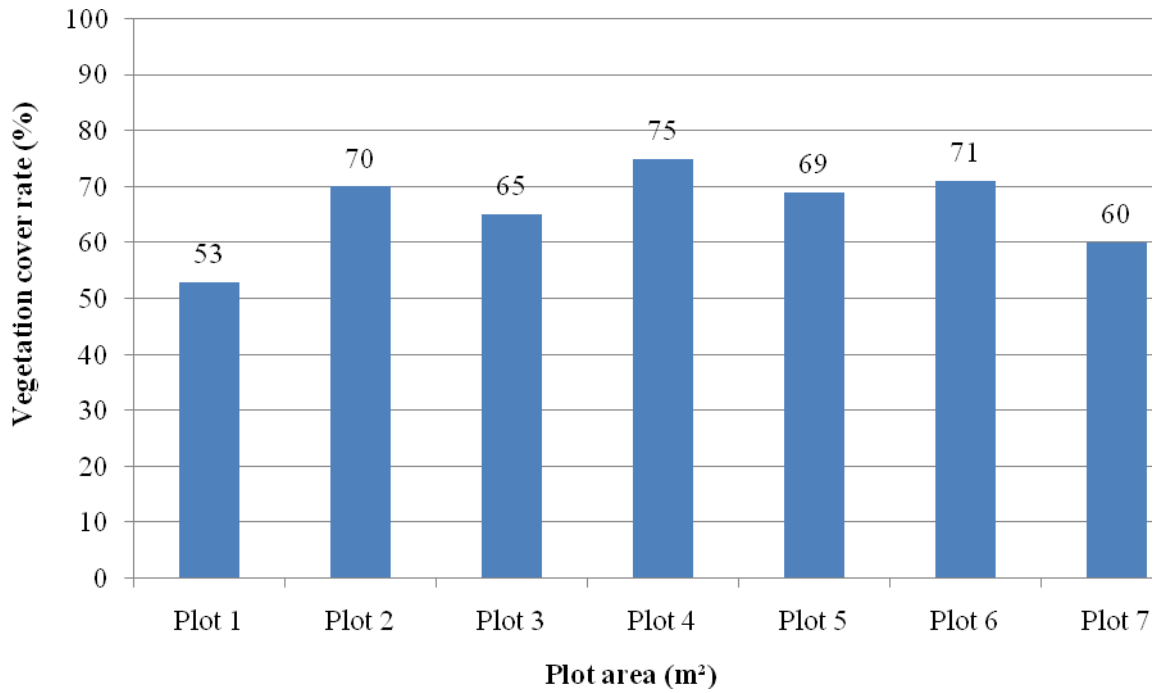

Table.1 Appearance frequency of plant species

Species name	Functional group	Abundance	Frequency (%)
Axonopus compessus	Grass	24	85.71
Para grass	Grass	23	82.14
Bracharia decumben	Grass	21	75.00
Kyllinga brevifolia	Grass	21	75.00
Cynodonda ctylon	Grass	20	71.43
Brachiaria mutica	Grass	11	39.29
Echinochloa polystachya	Grass	6	21.43
Cynodona ethiopicus	Grass	5	17.86
Chloris gayana	Grass	5	17.86
Imperata cyndrica	Grass	4	14.29
Cyperus rotundus	Grass	3	10.71
Eleusine indica	Grass	2	7.14
Total	**Grass**	**145**	**57.77**
Centro semamolle	Clover	22	17.86
Colopogonium mucunoides	Clover	13	78.57
Stylosanth eshumilis	Clover	7	46.43
Macroptilium lathyroides	Clover	6	10.71
Mimosa pudica	Clover	5	25.00
White clover	Clover	3	21.43
Total	**Clover**	**56**	**22.31**
Neonotonia wightii	Weed	16	57.14
Pueraria phaseoloides	Weed	14	50.00
Ageratum	Weed	12	42.86
Stachytarpheta sp	Weed	8	28.57
Total	**Weed**	**50**	**19.92**
Total all species	**All group**	**251**	**100.00**

Vegetation cover rate

The level of vegetation cover is a part of the ecosystem and has been used to estimate the monitoring of vegetation growing in a particular

area. Figure 3 shows the power of plant cover ranges from 53% to 75% with an average of 66%. The level of vegetation cover of plant species as fodder is moderate, because the average percentage is 66%, it is expected to renovate land for animal feed by increasing the population of dominant plant species, because the dominant plant species can survive with the original environment as well as contribute to the availability of animal feed.

Although there are more exotic species that appear, in this case, it is necessary to select plant species that can contribute as animal feed (Augustine, 1988). Most plant species show dominance, thus often due to events varying between temperature, sufficient humidity, and micronutrients (Tillman, 1999).

Conclusion

The dominance of plant species in Kemiri Village, Jember District were found grass more than 75% consist of *Axonopus compessus* (85.71%), *Para grass* (82.14%), *Bracharia decumben* (75%), *Kyllinga brevifolia* (75%), and clover was

Centrosema molle (78.57%). Comparison between plant species consists of grass 57.77%, legumes 22.31%, and weeds 19.92%. The common observation of plant height was 19.08 (cm), vegetation cover rate was 66%. The dominance of plant species could increase production, and conservation of availability to increase of animal feed supplies

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