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DEER'S NATURAL FEED AS A BIOINDICATOR OF CLIMATE CHANGE (STUDY CASE IN GUNUNG MADU PLANTATION INC. LAMPUNG TENGAH INDONESIA)

by

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ABSTRACT

Wildlife management should consist of population, habitat, and the role of the human. Habitat management involves aspects of food, water, space and cover. Aspects feed a role for the development of animal reproduction (population). Feed becomes urgent in ex-situ captive deer. Natural feed and drop in feed in ex-situ captive deer are very important for supporting deer population. Natural food is highly dependent on the seasonal change of climate change in Indonesia. This research was conducted in the area of sugar cane cultivation PT. Gunung Madu Plantations Lampung Tengah Regency of Lampung Province of Indonesia, in the area of ex-situ captive deer, November 2015, with the purposes of (1) identifying the natural feed available deer in captive PT. GMP and (2) the effect of climate change on the availability of feed deer. The method used are direct observation method in the summer and interviews method with key persons of captive deer management.

The results of the study of natural feed deer in captive PT. GMP are a bitter grasses, ferns lizards, sauh grass and elephant grass. Some trees as cover inside the captive deer were Adenantha pavonina, Schima wallichii, Parasierianthes falcataria, Leucenea leucocephala and Persea americana. Climate change affects the availability of feed deer. This research was conducted in the summer, with the biotic factors such as soil, water, dry climate. The results of this research found that the available feed in captivity relatively less than the standard deer per day. However, further research on the availability of natural feed deer in the rainy season is necessary.

Keywords: Climate change, Natural feed, Deer, GMP.

Preface

Animal is a natural resources, the preservation needs to be maintained in order to prevent from extinction either because of natural factors, as well as human activities such as poaching, and unauthorized possession of wildlife (Alikodra, 1990). The development of animal population determined by several factors such as age, sex composition, birthrate and mortality, as well as the habitat carrying capacity. Habitat carrying capacity is determined by the productivity of forage and wide areas used as habitat (Kartono, Santoso, Darusman and Thohari, 2008). Wildlife affect the soil and vegetation and played a key role in seed dispersal, plant growth, pollination and seed maturation, enrichment of the soil, decomposing dead organisms into organic substances that are more useful for the life of plants, pollination and modifiers vegetation and soil. According to Lisa, Praseno and Tana, (2013) in the management of deer populations, the carrying capacity is the maximum number of deer that can be supported by the area without causing damage to the habitat.

Habitat carrying capacity can be determined by measuring some part of constituent habitat. Feed is the most important habitat components, the availability of food is closely related to the changing seasons. In the rainy season is abundant amount of feed wasarailable while during the dry season the feed reduced. The staple food is deer forage in the form of leaves and grasses which the availability sometimes limited, especially in captivity so it takes

additional feed (Garsetiasih and Takandjanji, 2007; Dewi and Wulandari, 2011). Natural feed deer stag important survival (survival) and (GMP) important for reproduction in adding the deer population. Feeding behavior at a stag group typically begins when one or several deer come out of the bush or shelter to the paddock to graze, and then will be followed by other deer. During the grazing period, the deer are not always grazing, but grazing time interspersed with a short break, then continued grazing again and so on (Ismail, 2011).

One of the component of critical habitat and categorized as a limiting factor because it affected the well-being of population growth and development of animals was the food. This were understandable because the food is an important source of energy to meet the basic necessities of life, growth, rejuvenate organs parts, increasing the body's resistance towards disease. Thus the availability of food on the habitat of both quantity and quality sufficient, will have a positive influence on the development and growth of wildlife populations (Burhannudin, Kusuma and Rachmanhani, 2008).

1 Sambar deer (*Cervus unicolor*) was the largest tropical deer body size in Asia. The body size of stag sambar deer could reach 225 kg and doe 135 kg. The characteristics of the sambar coming from Sumatra is to have the leather color varies from brown to dark brown or reddish brown. Sambar adult have coarse hair. Sambar solitary (alone), but the group generally consists of two individuals (Harianto and Dewi, 2012).

6 Sambar and spotted deer sanctuary in Gunung Madu Plantations Inc is one of conservation efforts for the protection of wild animals. The advantage of this breeding is to preserve and increase the number of deer. An important function of breeding and the availability of natural feed deer, underlying the cause of study which important to be done. Location of the study described in Figure 1.

Research Method

Research on natural feed deer as bio-indicators of climate change In GMP. Inc Lampung Tengah district, Lampung Province , Indonesia conducted at GMP. Inc. Sanctuary in October and November 2015 (Figure 1). The instrument used in this study is stationery, cameras, digital clocks, scales, Garmin GPS handy and tally sheet.

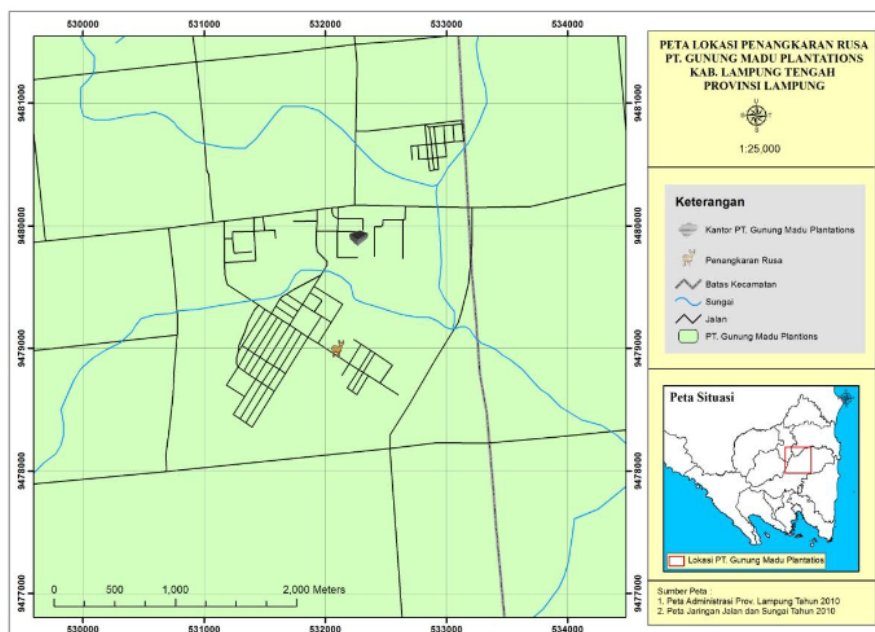


Figure 1. Location of Captive Deer at Deer Feed Preference Analysis research from October to November 2015 at a scale of 1: 25.000 Gunung Madu Plantations Inc Lampung Tengah (Setiawan, 2015).

The research object observed was a natural deer feed on deer sanctuary of GMP Inc. Primary data was taken directly from the observation area that includes the identification of natural feed. The secondary data that collected was

breeding locations maps and literature related to the study. Secondary data consist of general condition of the research sites such as the physical environment condition, the working area, and other data that support the research in GMP Inc.

Data on natural feed deer as bio-indicators of climate change collected by direct observation method (Zaitav, 2015) conducted in summer and interviews with key persons sanctuary management (Sugiono, 2013; Zazuli and Dewi, 2015). Data obtained from natural feed deer as bio-indicators of climate change were analyzed and described descriptively.

RESULTS AND DISCUSSION

Plants are the main feed sources that is important for wildlife, this is because the plants can proceed solar energy for photosynthesis, which in turn generates an energy. Animal feed containing various nutrients, with different levels. According Suratmo (1997) deer are herbivore that have diverse types of feed because it can live in primary forest, secondary forest and open grassland savvana. A green forage grasses was a deer's preferention because it contains a lot of water. Natural food species within sanctuary of Gunung Madu Plantations Inc presented in Table 1.

Table 1. Type of natural feed species in deer sanctuary of GMP. Inc. on October 2015.

No	Local Name	Scientific Name
1	Pait grass	<i>Paspalum conjugatum</i>
2	Pakis kadal grass	<i>Cyclosorus aridus</i>
3	Saga	<i>Adenantha pavonina</i>
4	Sengon	<i>Albizia chinensis</i>
5	Mentru	<i>Schima wallichii</i>
6	Avocado	<i>Persia americana</i>
7	Sauhen grass	<i>Panicum colonum</i>
8	Gajah grass	<i>Pannisetum purpureum</i>

Ruminants consume more forage than concentrate it is reinforced by Pilliang (1997) mainly grass forage and various grass species is a major energy source for ruminants. Source of feed for the deer in the study site were not only from the drop in feed provided by the captivity. Generally many undergrowth that wildy in the breeding cage consumed by deer as natural feed. Besides deer also undertake activities gathers eating, mating and caring for children in their habitats (Pairah, Santosa, Prasetyo and Mustari, 2014).



Figure 2. Pait grass (*Paspalum conjugatum*) (Indriyani, 2015).

Pait grass (*Paspalum conjugatum*) is a grass that grows in deer sanctuary of GMP. Inc (Figure 2). Pait grass (*Paspalum conjugatum*) as grass that deliberately left to grow wild in captivity as an additional feed for deer. Pait grass grows very well, which was a natural food grown for the deer feed consumption. Pait grass during the dry season does not

grow well. Pait grass decline, such as dry and even death. While during the rainy season pait grass thrive in captivity, therefore managers does not need to provide a drop-in feed for the deer that within captivity. Pait grass during the rainy season has been insufficient supply of natural feed.



Figure 3. Lizard fern (*Cyclosorus aridus*) (Indriyani, 2015).

Lizard fern (*Cyclosorus aridus*) characterized by its field, curved leaves (Figure 3). Lizard fern (*Cyclosorus aridus*) is one of the grass that grows in deer sanctuary which commonly consumed by deer that given by the keeper was used up. Lizard fern that grows in captivity, in good condition. Lizards fern rely heavily on the season, rainy season and dry season. During the dry season grass lizard ferns decreased, which becomes dry and death. In the rainy season the grass grows very lush in captivity, this shows that the season was very influential on the growth of grass.



Figure 4. Elephant grass (*Pennisetum purpureum*) (Indriyani, 2015).

Elephant grass (*Pennisetum purpureum*) is a grass family (graminae) which are useful as animal feed particularly ruminants (Figure 4), the elephant grass (*Pennisetum purpureum*) are usually harvested by cutting the whole branch then given directly as forage for buffalo, deer and goats or it can also be used as feed stock through the preservation process forage feed. Feeding value of elephant grass affected by the ratio of the leaves number on the stem and age. The content of nutrients contained in the elephant grass (*Pennisetum purpureum*) were given to feed the deer in GMP. Inc sanctuary which has about 9.30% crude protein and crude lipid 2.48%. Elephant grass (*Pennisetum purpureum*) in general is an annual plant that stands rooted in height with short rhizomes. Elephant grass (*Pennisetum purpureum*) many contain quite water. Soebarinoto, Chuzaemi and Mashudi (1991) explains that the protein in the rumen was hydrolysed into peptides by proteolysis enzyme produced by microbes. The protein requirement determined by the quality of protein from feed ingredients. Protein is needed, especially during the growth period (Afzalani, Muttalib and Musnandar, 2008).



Figure 5. Sauhen grass (*Panicum colonum*) (Indriyani, 2015).

Sauhen grass (*Panicum colonum*) is spread plants which formed roots and new shoots on the books of the stem base of the stems that grow tall and leafy (Figure 5). Have hairs are thirsty and sparse. Sauhen grass (*Panicum colonum*) also has a fairly high water content, therefore keeper gave sauhen grass (*Panicum colonum*) as one of feed for deer in GMP Inc sanctuary.



Figure 6. Saga (*Adenanthera pavonina*) (Indriyani, 2015).

Saga (*Adenanthera pavonina*) in GMP. Inc sanctuary have a fairly good condition, but the bark emarked in the dry season saga trees shed their leaves (Figure 6). The trunk of saga droughted resulting. Conditions of saga trees in GMP. Inc live well as under direct sunlight, this is because the saga tree was the highest among the other trees. This is consistent with the statement of the Putri and Purnomo (2013) that Saga (*Adenanthera pavonina*) is a plant that preferred on open and exposed to direct sunlight, both in lowland and upland. Saga trees (*Adenanthera pavonina*) has many versatile benefits for almost all parts of the plant such as leaves can be used as animal feed, the trunk can be used as building materials and furniture and seeds saga (*Adenanthera pavonina*) can be used as various kinds of ornaments. Saga seeds (*Adenanthera pavonina*) podded. The average length of young pods was 0.8 cm. Saga pods (*Adenanthera pavonina*) grow and develop to become soft pods containing the seeds, and then transformed into a dense pods and fresh green.



Figure 7. Sengon (*Albizia chinensis*) (Indriyani, 2015).

Falcata which is situated in GMP. Inc sanctuary grows very well, but in the dry season Falcata slightly decreased (Figure 7). From the start leaves begin to fall and susceptible to rust disease. This is consistent with the statement of Setiadi, Baskorowati and Susanto (2014) that Falcata sengon Tree (*Albizia chinensis*) have high in demand by many people, especially farmers. The people generally use Falcata (*Albizia chinensis*) from the age of 4-10 years. Sengon very rapid growth is still constrained by the presence of rust disease that attacks sengon. Disease process can take place if there are three factors interacting that caused the disease, the presence of plants that are vulnerable and the environmental conditions that favor disease process. The growth rate of sengon (*Albizia chinensis*) increases at the age of 6, 12 and 18 months. Height and diameter growth of trees greatly increases during the measurement period of each family and showed relatively uniform. The average height and diameter growth at the age of 6 months about to 2.43 m and a diameter of 2.97 cm.



Figure 8. Mentru (*Schima wallichii*) (Indriyani, 2015).

Trees Mentru (*Schima wallichii*) is able to live a variety of soil conditions, climate and habitat (Figure 8). Often found growing abundantly in the plains to the mountains, mentru trees (*Schima wallichii*) are also common in secondary forest and disturbed areas, even in grassland. Conditions of mentru trees (*Schima wallichii*) is still relatively easy to find in Borneo because of mentru (*Schima wallichii*) are able to live in a variety of soil conditions, climate and habitat (Purnama, Jumani and Biantary, 2016). Mentru tree (*Schima wallichii*) usually live in group and in flat areas and ramps. The

potential of mentru trees (*Schima wallichii*) can be seen from the number of hight free branch volume. The dencity of tree composition in deer is sanctuary quite open, allowing the undergrowth to live under the tree stands.

CONCLUSION

Deer's natural feed growth in GMP. Inc. Sanctuary were pait grass, lizards ferns, sauhen grass, elephant grass. There is also a shade tree such as *Adenantha pavonina*, *Schima wallichi*, *Paraserianthes falcularis*, *Leucaena leucocephala* and *Persian americana*. Climate change affects the availability of natural feed, in dry season the availability of feed in captivity relatively less than the standard needs of deer per day.

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