Forage Food of Timor Deer (*Cervus timorensis*) in Manokwari, West Papua

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Abstract. Traditionally, back yard deer husbandry is well developed in some parts in Papua, though information on deer husbandry has not been provided yet. Therefore, this study was aimed at highlighting the diet provided to the deer in back yard husbandry model in Manokwari. Survey method was approached by visiting eight deer back yard farmer respondents. Direct observation to the feeding site and semi-structured interview were carried out to learn about the deer management system, and identify the forage diet species consumed and served to the animals. The results indicated five most common forage species consumed in the study; they were field grass, Imperata (*Imperata cylindrica*), elephant grass (*Penisetum purpureum*), king grass (*Penisetum purpureopoidhes*) and *Melinis minutiflora* depending on the location of farmed deer. Drinking water was offered and feed supplement such as various leafs, food and vegetable left over and banana peel was provided by 62.5% of the respondents. Food supplement was given two times per day (morning, evening) and (afternoon, evening). Forage food species consumed in the study sites were relatively more similar to the food in the natural habitat.

Key Words: forage, food, Timor deer, Manokwari

Introduction

Deer production was highly developed in the tropical and sub-tropic areas, and the most common practice implemented in some Asian countries was housing production with cut and carry feeding system (Dryden, 2003). This situation of captive breeding was most commonly found and they had highly economical value as animal husbandry (Sinclair and Woodford, 2000; Webley et al*.,* 2004).

Results from previous studies indicated that developing deer farming system is very potential and it creates significant future expectation (Semiadi, 1986; Badarina, 1995; Subekti, 1995 and Pattiselanno, 2003). Therefore, deer (*Cervus timorensis*) is recognized as one of the animals that is possibly developed as husbandry animal in Indonesia, because they have high ability to adapt with different environment conditions where food was limitedly available. Leaves and forage are the majority of consumed food, and they are able to adapt with limited water availability so they are able to alternate with different agro-ecosystem conditions (Naipospos, 2003; Badarina, 1995). Unfortunately, related information on deer production in some developing countries was lagging behind and poorly published (Sinclair dan Woodford, 2000).

Small scale unit raising deer under captivity condition was found and developed from time to time such as in Manokwari, Oransbari and Ransiki with different purposes (Pattiselanno et al*.,* 2008a). As cited by Pattiselanno et al*.,* (2008a) back yard system practices were well adapted with forage system available in the surrounding captivity location. Currently, forage food consumed by deer in back yard styles in Manokwari was not well documented yet, therefore identifying the forage diet species of deer was carried out in order to provide baseline information about deer diet in confinement for the future development of deer production systems in Manokwari.

Materials and Methods

Study sites and date

The study was conducted in Manokwari. Field research was conducted by visiting six places surrounding the city of Manokwari, where the back yard deer systems were found. There were fourteen deer kept by eight respondents with a ratio of 1:1 for males and females. Based on the group age, deer ranged between 2–6 years, with females age

composition of 2-6 years and 3-6 years for males (Table 1). Data on food types, food availability, food supplement and drinking water (DW) were observed from March to May 2005.

Methods

Field visits were conducted to eight deer back yard respondents. Direct observation was done to identify the management aspects and morphology characteristics of the framed deer in the study sites. Information on management aspects including husbandry practices, housing, food, number of deer, sex and age were studied (Pattiselanno et al*.,* 2008a). In addition, data on morphology characteristics were obtained through morphometry measurement and feather color pattern analysis (Pattiselanno et al*.,* 2008b).

In this paper we drove our focus on food management, particularly to identify forage food types and analyze their availability. In addition we also focused on food supplement and DW management. Therefore, visit to fed sites were done to identify the forage food consumed and the supplement food served. Semi-structured interview was carried out to learn about the diet management system including feed supplement and DW management. Forage diet was sampled and identified on the field and those cannot be identified at the sites were set as herbaria specimen and they were further identified in Animal Nutrition and Food Laboratory and Manokwariense Herbarium.

Research Procedures

To obtain accurate information on deer back yard systems, preliminary survey was done to find out the location of back yard systems. Meeting with the owners was set to locate time for visiting and data gathering. Observation to the field was carried out to learn about the management practices and to identify the forage food consumed at the sites. At the same time, food availability was examined through visual observation at the surrounding sites.

Additional food was also identified and food serving frequency was examined. During this activity, DW management was observed as well. Plant species identification was done at the sites, while unidentified species were collected and set as herbaria for further identification in the laboratory. Descriptive statistical analysis was used, i.e. mean, median, range, frequency and percentages and they are presented in tables and figures.

Results and Discussion

General description of back yard deer systems

Our results indicated that food and DW management was different among respondents and the detail information is presented in Table 1. Farmed deer originated from Saukorem, a region placed along the coastal site between the border of Manokwari and Sorong was the majority in adjacent of Manokwari, 21.4% coming from Bintuni and Wasior and 7.1% caught from Anggi, the upland area in Manokwaridi. Housing for the animals did not

Table 1. Feeding and watering management

No	Water reserved	Location	Staple food	Additional food	Food type	Frequency of feeding
1	Provided	Amban (1)	Field grass	Available	Tuber leaves	2 (M – E)
2	Provided	Fanindi (2)	*Imperata cylindrica*	Available	Vegetable waste	2 (A – E)
3	Provided	Fanindi (1)	(*Penisetum purpureum*)	Not available		
4	Provided	Kampung Ambon (2)	(*Musa sp.*) leaves	Available	Offal	2 (A – E)
5.	Provided	Brawijaya (3)	Field grass	Available	Banana peal	1 (M)
6.	Not provided	Wosi (1)	*Melinis minutiflora*	Not available		
7.	Not provided	Wosi (2)	(*Pluchea indica (L)* Less) leaves	Not available		
8.	Provided	Rendani (2)	(*Penisetum purpureophoides*)	Available	Vegetable waste	2 (M – E)

Numbers in brackets refer to deer number M = Morning, A = Aftrnoon, E = Evening

exist yet, therefore it was common to keep the animals around the house yard (62.5%) and the rest was allowed to browse forage food in the field close to the owner's houses. Typically, this system reflected an extensive farming system or traditional farming. However, Hudson (1989) described that ranching and farming systems are those in which animal distribution are critically controlled by physical barriers. Therefore, our findings are considered as part of farming system where deer movement was controlled by 4 to 6m rope knotted to the deer. Similarly, Semiadi (1996) revealed that in Timor Island, a movement of back yard Timor deer was limited by attaching 6-8m rope to their neck.

Drinking water and food management

The majority of the farmers (75%) served DW to deer while the rest 25% did not. Farmers acknowledged that the deer are capable of living in the shortage of water and are easy to adapt with the dry condition. Therefore, there were two respondents who did not give DW to the deer during day time. DW was only given in the evening (06 to 07 pm) when the animals were resting. As cited by Semiadi (1996), there is a tendency of Timor deer to decrease DW during the rainy season noted as deer drinking behaviour. Water requirements of the ruminant are supplied from DW, water contained in food and metabolic water. Some external factors maybe influenced the DW requirements of the animals including water content, food nutrient and quantity of food, water temperature and environmental factors such as the ambient temperature and humidity (Squires, 1993 as cited by Kii and Dryden, 2005).

Major feeding of deer varied between farmers, and was clearly dependent on the sites where deer was reared. In terms of feeding composition, grass was the highest diet (approximately 75%) while other leaves and forages were served as minor diet to the 25% of the animals. The study of Aleandri et al*.,* (1989) cited by Mettiello et al. (1997) indicated that there was a different in food preference between males and females fallow deer. Females showed a higher preference for pasture, while males tend to eat more leaves. However, in this study we did not identify food preference between males and females deer, but our finding expresses deer feeding behavious either as grazers or browsers.

Major diet of the farmed deer was commonly taken from the surrounding area where the animals were raised. Where deer was attached around the house yard or in the field, grown forage, field grasses and under storey leaves found around the site were considered as the major feeding on the animals. Our findings showed that five of the most common five forage species consumed in the study site were *rumput lapangan* (field grasses), *alang alang* (*Imperata cylindrica*), elephant grass (*Penisetum purpureum*), king grass (*Penisetum purpureopoidhes*) and *Melinis minutiflora* and particular leaves grown around the study site such as banana leaves (*Musa sp*.) and *beluntas leaves* (*Pluchea indica (L)* Less). The results were relatively similar to the findings of Duwila (2001) that forage feeding consumed by the deer in Manokwari, Oransbari and Ransiki was field grasses, King grass, Lamtoro (*Leucaena leucocephala*), vegetables offal, left food, plant leaves and banana pealing. It is clear that deer is able utilize available vegetations surrounding them and therefore food were not the limiting factor in developing deer farming.

Wirdateti et al*.* (1997), explained that deer under the confinement in Taman Safari Indonesia was served with King Grass and weed, sweet potatoes, carrot and commercial concentrate food. Tekandjanji and Gersetiasih (2002) on the other hand indicated that food served to the deer in captivity in East Nusa Tenggara consisted of *rumput Gajah* (*P. Purpureum*), *rumput Raja* (*P. Purpureopoidhes*), *turi* (*Sesbania grandiflora*), *lamtoro* (*Leucaena leucocephala*), *beringin* (*Ficus benjamina*) and *kabesak* (*Acacia leucocepahala*). Other findings of Wirdateti et al*.* (2005) revealed that approximately 40 species, and mostly from *Euphorbiceae, Leguminoceae, Fabaceae, Poaceae* and *Convolvulaceae* were consumed by *Cervus timorensis* in captivity area in PT Kuala Tembaga, in Bitung, North Sulawesi. Similar finding was also revealed by Garsetiasih (2005) that certain forages have been consumed by deer in captivity, for example: *Setaria sp*., *Brachiaria decumbens, Andropogon*

contortus, Eragrostis bahiensis, Scleria lithosperma and *Andropogon fastigiatus.* Those previous literatures indicated that grasses, vegetables and leaves were among food consumed by deer in different parts of Indonesia, and hence, food was not a limiting factor to breed deer in captivity (Semiadi, 1986; Subekti, 1995). Moreover, improved grazed areas contribute significantly in increasing doe pregnancy (Le Bel et al*.,* 1997)

Feed supplement was considered by 62.5% of the respondents, who had experienced that food supply was scarcely available and tended to insufficient for the farmed deer. This is the reason why feed supplement was given twice a day in the form of plant leaves including banana peel, food left over and vegetables. The frequency of feed supplement was given twice either morning – evening or afternoon; evening feeeding was introduced by the farmer but only one who gave feed supplement in the morning. (Morning is between 8 to 11am, afternoon is 11am to 6pm and evening is past 6pm). This practice was done to at least fulfill farmed deer basic requirements for maintenance and production. However, Grenier et al. (1999) revealed that feed supplement is not sufficient to satisfy deer basic need and it tends to cause starvation.

Studies on deer food in their natural habitat have identified plant species consumed by deer. Pattiselanno and Arobaya (2009), found five of eleven species of grassland low layer vegetation at the upland Kebar, Manokwari including *I. cylindrica, P. conjugatum, T. arguens*, *M. minutiflora,* and *C. rotundus.* Kencana (2000) explained that *T. arguens, C. rotundus* and *I. cylindrica* are the food plants of deer in the Rumberpon Island. In Wasur Merauke, potential forages identified as food plants for deer were *Setaria sp.*, *Panicum maximum, P. purpureum, Setaria spachelata, Brachiaria decumbens* and *Melinis minutiflora* (Environment Study Center of Papua University, 2000).

According to Badarina (1995), deer has an ability to eat grass and almost all plant leaves. It was in agreement with the statement of Naipospos (2003) that deer can adjust with limited food supported and relatively easy settle in different agro ecosystem. From different point of views on deer adaptation, Simanjuntak dan Ariaji (1984) concluded that deer farming was possible because of several reasons that the animals (1) origin from Indonesia, (2) easily occupy dry and hot areas and (3) have high level of adaptation to different climate conditions. Related to food and nutrition in captivity condition, according to Tekandjanji dan Gersetiasih (2002) there are three basic requirements that have to be met in raising deer, i.e. (1) basal diet prior to forage, required additional supplement such as in offered frequency of 1-3 times daily, mineral and drinking water provided, (2) deer grouping based on the physiology status to ease feeding and mating arrangement and animal safety during the rut season, and (3) designing the captivity environment closer to the real habitat in nature, particularly to the habitat component which is important to the farmed deer for example, food, canopy, space and water. Deer is significantly potentially to contribute to the communty welfare (Zein and Saim, 2000)

Conclusions

Most common forage food found in the study site were *rumput lapangan* (field grass), *alang alang* (*Imperata cylindrica*), *rumput gajah* (*Penisetum purpureum*), *rumput raja* (*Penisetum purpureopoidhes*) and *Melinis minutiflora*. Drinking water was offered and feed supplement such as various leafs, food and vegetable left over and banana peel was provided by 62.5% of the respondents. Food supplement was given two times dayly (morning, evening) and (afternoon, evening). Forage food species consumed in the study sites were relatively similar to the food in the natural habitat.

Timor deer seem to adapt very well to different environments but knowledge of food nutrients related to food quality and food preference is prerequisite to any improvement of farming techniques. It is also important to carry out further study on DW requirements particularly in determining level of DW consumption and study on its influence of different types of food on DW consumption.

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