Nutrient Adequacy of Bali Cattle Fed Only Forage Derived From Palm Oil Plantation in Riau Indonesia

Eny Endrawati[1], Panjono[2], Bambang Suhartanto[2], and Endang Baliarti[2]
[1]Faculty of Agriculture Khairun University
[2]Faculty of Animal Science Universitas Gadjah Mada
Corresponding email: [1] enyendra@yahoo.co.id

ABSTRACT

An integrated system of cattle with palm oil plantations in Indonesia is potential in order to increase the cattle population in a sustainable manner. The study aims to assess the adequacy of Bali cow nutrient consumption only fed with forage derived from oil palm plantations. Five Bali cows pregnant about 5 months and 7 cows are not pregnant observed to find out their feed consumption. Cows were given only forage derived from oil palm plantations in Riau which contains dry matter (DM) 22.24%; crude protein (CP) 10.67%; crude fiber (SK) 36.85% and total digestible nutrients (TDN) 54.37%. Forage gave ad libitum. Observations consumption of cows in individual cages made for seven consecutive days, compared to the needs according to NRC (2003). The results showed that if only fed with forage of palm oil plantations did not meet the requirement of the cow; on the condition of pregnant, deficiency of DM as much as 2.76±0.20 kg/head/day (44.29±2.56 g/kgW^{0,75}/day; CP as much as 176.0±35.8 g/head/day (2.83±0.62 g/kgW^{0,75}/day); TDN as much as 1.39±0.20 kg/head/day (22.30±1.58g/kgW^{0,75}/day), while the not pregnant cows shortage DM as much as 2.01±0.41 kg/head/day (32.77±5.85 g/kgW^{0,75}/day); CP as much as 81.4±40.5 g/ head/day (1.30±0.65 g/ kgW^{0,75}/day); TDN as much as 1.03±0.22 kg/head/day (16.80±3.16 g/kgW^{0,75}/day). From the study it is concluded that consumption of Bali cow fed only forage from palm oil plantation can not meet their nutrient requirements; additional nutrients are needed, more on a pregnant cow than not pregnant.

Keywords: Level of nutrient adequacy, Bali cows, Forage on the palm oil plantation

INTRODUCTION

Domestic cattle production is not sufficient, therefore it takes various efforts to increase the population. An important factor needed for population growth is optimizing the productivity of the mother cow. Successful increase in productivity of the mother cow, among others, by the adequacy of feed in a sustainable manner.

The availability of feed both in quantity and quality throughout the year for massive efforts to increase population to date is still experiencing barriers, such as the increasing competition of feed ingredients between humans and livestock, the high price of raw materials and increased use of land for human food and shelter So the land for the development of forage feed is getting narrower (Hanafi, 2004).The use of non-conventional feed which is a new source of cheaper feed, more production and sustainable, and not compete with human food is important to be developed. One of the efforts to provide sufficient feed for livestock is optimally utilizing oil palm plantations with an integrated pattern that can replace some or all of the forages and can reduce dependence on the use of concentrated ingredients that are commonly used (Warta, 2003).The pattern of business development that combines the business of oil palm-cattle plantation is the development of livestock business without having to open new land. Oil palm plant as main component and livestock as complementary (Ditjen Peternakan, 2008).

In 2014 the area of oil palm reaches 10.9 million ha with the details of the people's property (Perkebunan Rakyat) of 4.55 million ha or 41.55% of the total area, state-owned PT Perkebunan Nusantara (PTPN) of 0.75 million ha or 6.83% of the total area, private property of 5.66 million ha or 51.62% (Directorate General of Plantation, 2014). The Minister of State-Owned Enterprises (SOEs) with extraordinary targets requires all oil palm PTPN to raise cattle by applying 100,000 head of cattle in 10 PTPN oil palm in 2014.

Forage acts as a motivating factor for cow rumen to function normally so as to affect health and productivity (Abdullah *et al*., 2005). Almost 70% of the forage consumed by livestock in Indonesia comes from local grass species (Abdullah, 2006). Awaludin and Masurni (2004) stated that almost all grass species that are weeds in oil palm plantations are favored by cattle. The potential for forage vegetation among palm trees can be utilized by livestock, so the plantation can save the weeding costs 25-50%. It is estimated that 70-80% of the area of oil palm plantations can be utilized as a source of forage. In relation to the development of livestock, it is necessary to study the potential of the region and the needs of the farmers, including forages for animal feed as a source of energy, manure producers, and income sources.

Various species of local grass can be found under the auspices of oil palm plantations and have become part of the ecology of the plantation. One aspect that needs to be considered in the development of the integrated cattle population of palm oil is the nutritional needs in the animal feed. Not much data has been found regarding the potential for local grass nutrition in oil palm plantations as animal feed. This research is very important because the information on nutrient content and forage consumption obtained from the oil palm plantation is very helpful to the local government and related parties in designing the development of cattle breeding, especially for cattle.

MATERIALS AND METHODS

The experiment was conducted at PTPN V Sei Rokan Experimental Seat, Riau Research time for 3 weeks from May 26, 2016, until June 16, 2016. The material used is Bali Balinese cow pregnant as much as 5 head and 7 heads un pregnant aged 4 to 5 years with the weight Bodies of about 250-275 kg and forage feed obtained from oil palm plantations. The forage samples taken from survey area were then analyzed proximate (DM, CP, and TDN).

Individual enclosures are equipped with separate feeding and drinking places, digital scales of Rudweigh brand capacity of 1.000 kg with accuracy of 0.2 123 kg for weighing livestock, ACIS digital scales 15 kg of accuracy of 1 gram to weigh feed and feed sample, Willey mill filter diameter 0,2 mm, jar, oven and a set of laboratory equipment for proximate analysis (DM, CP and TDN).

Twelve heads of cattle are divided into 2 groups: the mother is pregnant and not pregnant. Each group of livestock is given feed and drinking water ad libitum. The variables observed were the consumption of DM, CP, and TDN as well as the balance of needs of DM, CP, and TDN.

RESULTS AND DISCUSSION

Composition of Nutrient Forage from PTPN V Riau Oil Palm Plantation

The composition of nutrient forage from PTPN V Sei Rokan palm oil plantation, Riau which is given to Bali cow breeder pregnant and not pregnant as in Table 1.

The results of this study is similar to that of Bamualim *et al*. (1994) which states the content of feed PK 11-12% and TDN 48.5%. Imran (2013) states the range of feeding densities in wetlands 12-15.5%; PK: 7,1-8,9%; LK: 2,2-2,5%; SK: 25.5-26,5%; BETN: 50% and TDN: 58-59%, while dry area BK: 8-15,5%; Gray: 15-15.6%, PK: 6%; LK: 1.9-2%; SK: 25.5-26.3%; BETN: 50-51% and TDN: 55-56%. Consistent with Daru et al. (2014) study reporting nutrient content of forage that grows under oil palm 3 years PK: 8.25%; SK: 23.2%; LK: 4.2%; Gray: 2.48% and BETN: 61.87%, while at 6 years PK: 10.5%; SK: 22.43%; LK: 2.4%; Gray: 2.48% and BETN: 60.69%.

Table 1. Composition of nutrient forage from oil palm plantation PTPN V Sei Rokan, Riau

Nutrient	Dry material (%)
Dry matter	22,29
Ash	11,53
Crude protein	10,67
Crude Fat	4,26
Coarse fiber	36,85
BETN	36,69
TDN	54,37

Source: Biochemistry Laboratory Analysis Result, UGM (2016).

Consumption of Forage Feed from Palm Oil Plantation

The average consumption of forage feed from oil palm plantation per body per kilogram and per kg of fuel is presented in Table 2.

Consumption of DM, CP results of the study on the parent cow is nopregnant higher than the pregnant. This is due to the consumption of DM in cattle unmarried cattle have a higher tendency than pregnant cows ($p<0.103$). TDN consumption of bunting cows is higher than inpregnant cows, indicating the efficiency of energy utilization in Bali bunting cattle is higher than not pregnant. Balance needs of DM, CP on the parent bunting cattle is higher than not pregnant, this is due to the consumption of DM and CP on the parent bunting is lower than not pregnant. The balance of the need for non-bovine TDN cows is higher than bunting cattle, due to lower non-bovine cow TDN consumption compared to pregnant women. The average BK consumption of the results of the study was lower than the results of the study Anggraeny (2010) which state the consumption of DM, CP, and TDN on parent bunting in the farm people are respectively: 8,089±0.61; 0.664±0.09 and 3.79±0.08 kg / head / day, as well as the results of Imran's (2013) study which states that the consumption of BK in the wet area 5.55±0.91 - 7.78±1, 11 and almost the same in dry areas 3.83±0.65 - 7.80±1.17 kg / BB / day. Similar results Muditha *et al*. (2016) states the consumption of DM, CP, TDN and the percentage of BB in the farms of the people respectively are: 4.45±0.44 kg; 0.41±0.04 kg; 2.26±0.22 kg and 1.86±0.11%. The average CP consumption of the results of the study was lower than the results of Imran's (2013) study which stated that the consumption of CP in the wet area was 0.42±0.06 and almost the same for the dry areas of 0.31±0.05 - 0.44±0, 06 kg / BB/day.

Table 2. Consumption of forage feed from oil palm plantations

Parameters	Pregnant cow	Un pregnant cow
Initial weight (kg)	249.58±12.31	241.46±15.58
Consumption		
- Percentage of BB (%)	1.47±0.07	1.67±014
- Dry matter (kg / $BB^{0.75}$)	58.84±3.18^{a}	65.75±5.34^{b}
- Crude protein (g / $BB^{0.75}$)	6.34±0.64^{a}	7.66±0.60^{b}
- TDN (kg/$BB^{0.75}$)	31.64±1.83	34.56±5.27
Feed requirement		
- Dry matter (kg / $BB^{0.75}$)	103.12±1.25	98.5±1.60
- Crude protein (g / $BB^{0.75}$)	9.17±0.11	9.97±0.7
- TDN (kg/$BB^{0.75}$)	53.93±0.66	52.58±0.87
Balance requirement		
- Dry matter (kg / $BB^{0.75}$)	-44.29±2.86^{a}	-32.77±5.85^{b}
- Crude protein (g / $BB^{0.75}$)	-2.83±0.62^{a}	-1.30±0.65^{b}
- TDN (kg/$BB^{0.75}$)	-22.30±1.58^{a}	-30.33±3.16^{b}

Source: Data preparation 2016
Ket: Different superscripts on the same line show a real different ($P<0.05$).

Consumption of DM, CP forage from oil palm plantation based on metabolic weight on how parent is not pregnant higher than pregnant mother, this is according to opinion Yulistiani *et al*. (1999) which states that the rumen volume in the old pregnant phase will drop by 30% due to the suppression of the rumen ventral part by the fetus resulting in a decrease in the ability to consume dry matter. The decrease in consumption of DM will be followed by decreased consumption of CP.

TDN consumption of bunting cows is higher than not pregnant, it shows the efficiency of energy usage based on BBM on thepregnant mother is higher than not pregnant. Balance needs of DM, CP parent bunting cattle higher than not pregnant. The balance of need for non-bovine TDN of pregnant cows is higher than bunting cattle The mother's nutritional requirement for 3 months after pregnancy is as follows: DM is 6.6 kg, CP is 0.579 kg and TDN is 3.4 kg (Kearl, 1982).

The level of consumption of dry matter is strongly influenced by the energy requirements for livestock and rumen capacity as well as determined by the content of food substances from the feed given. Livestock will continue to consume dry ingredients until their energy needs are met, and will stop eating when energy needs are met, even if the rumen capacity is not full. Conversely, if the rumen capacity is full then the livestock will stop eating even if energy needs have not been met (Sentana, 2005).

CONCLUSIONS

Forage feed from oil palm plantation in PTPN V contains DM: 22,24%; Ash: 11.53%; CP: 10.67%; EE: 4.26%; CF: 36.85% and TDN: 54.37%. Single grass feeding from oil palm plantation for pregnant mother lack of DM: 2,82±0,2 kg; CP: 198±38.5 gr and TDN: 1.42±0.1 kg, while in the parent is not pregnant DM: 2.25±0.42; CP: 89.9±41.1 grams and TDN: 1.86±0.2 kg.

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