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Behavior of Bali Cows at Different Reproduction Phase that Kept in Oil Palm Environment

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ABSTRACT

Cows will be productive if they live in the suitable environment. The suitability of the environment for the cows can be identified from their behavior. This study was conducted to observe the behavior of Bali cows in the area of oil palm plantations in Rokhan Hulu District, Riau Province, Indonesia, at the different reproduction phase. Twelve heads of Bali cows which were consisted of pregnant (n=4), lactating (n=4) and dry-open (n=4) cows were used in this study. The animals were observed their behaviors as long as 24 hours for 7 consecutive days. The data collected were the behavior of eating, lying down, standing, rumination, the frequency of feeding, the frequency of drinking, the frequency of lying down, urination, and defecation. The environmental parameters included light intensity, temperature, and humidity was observed at 06:00, 12:00, 18:00 and 24.00 for 12 consecutive days. Feed Consumption (intake) was too measured with ad libitum method in 7 days. The data collected were analyzed using one-way analysis of variances. The daily light intensity was ranging from 0,1 to 14.463,9 lux, the temperature was ranging from 25,1 to 38,4°C, and the humidity was ranging 46,4 to 90,5%. The eating, lying, standing, and rumination time and frequency of pregnant, lactation, dry-open cows were 8.1±0.9, 8.1±0.8, and 7.9±0.1 hours/day; 10.8±1.1, 10.5±1.4, and 10.1±1.3 times/day; 10.4±1.4, 10.3±1.0, and 9.9±1.0 hours/day, 8.5±1.2, 10.0±1.2, and 8.4±1.3 times/day; 13.6±1.4, 13.7±1.0, and 14.1±1.0 hours/day, 8.8±1.0, 10.2±0.8, and 8.7±1.4 times/day; and 6.7±0.9, 6.7±1.0, and 7.2±0.4 hours/day, respectively. The frequency of drinking, urination, and defecation of pregnant, lactation, dry-open cows were 4.4±0.7, 6.3±2.8, and 4.1±1.3 times/day; 5.4±2.7, 8.5±1.2, and 6.0±1.8 times/day; and 5.2±0.8, 6.5±0.9, and 5.5±0.4 times/day, respectively. The behavior of Bali cows at all reproduction phase was in the normal range. It is concluded that the environment of oil palm plantations in Rokhan Hulu district, Riau Province, Indonesia is suitable for the Bali cows to live.

Keywords: Behavior, Bali cows, Oil palm plantations environment

INTRODUCTION

Comfort and conformity to environmental conditions become one of the main factors of livestock including cows to maximize productivity. An indicator of cows comforts level expressed by behavior. According to Esmay and Dixon (1986), cows behavior is used as an indication of livestock comfort, since behavior is a response of livestock to environmental conditions. The results of research by Istika (2014) on the behavior of Indonesia local cows (Bos indicus) compared

with the crossing between Bos indicus and Bos taurus in tropical climate (Indonesia) showed that there was a significant difference in the cows behavior, especially at duration of eating, duration of rumination, frequency of urination, and defecation. Another study conducted by Hendri (2013) states that wet tropical climates such as in Indonesia have significantly affected the decrease in comfort levels in Simmental-Ongole crossed (SIMPO) cows as indicated by lower feed intake and higher drinking water consumption compared to Ongole crossed cattle. In Sumba Ongole (SO) cows ate more with higher dry matter digestibility at ambient temperatures of 23 ° C than kept at 33 ° C (Winugroho, et al., 1996).) Some of the results suggest that the environment greatly affects the comfort of livestock will also affect the productivity.

The palm oil plantation is one commodity that is expected to be a good cattle development area due to the availability of abundant forage biomass.The environmental condition of oil palm plantation is still not much studied, especially the feasibility and compatibility of cattle. A study on the condition of the environment and the comfort level of the mother cow needs to be done.The behavior of the cattle will illustrate the compatibility of the Balinese cow colonies to the palm oil plantation environment because the behavior is a form of expression of livestock to the environment (Maulana, 2016).The results of environmental analysis and comfort level Livestock aka N is useful in determining the strategy of developing livestock in the area of oil palm plantations. Knowledge of local livestock behavior is necessary to know as it will assist in applied maintenance management strategies and ecosystem development in order to boost livestock productivity (Dicko and Sikena, 1991). Understanding the impact of social interactions on the welfare and productivity of cattle is crucial for the implementation of better farm practices (Shin et al., 2017).

MATERIALS AND METHODS

This study was conducted to observe the behavior of Bali cows in the area of oil palm plantations in Rokhan Hulu District, Riau Province, Indonesia, at the different reproduction statues. Twelve heads of Bali cows which were consisted of pregnant (n=4), lactating (n=4) and dry-open (n=4) cows were used in this study. The animals were observed their behaviors as long as 24 hours for 7 consecutive days. The data collected were the behavior of eating, lying down, standing, rumination, the frequency of feeding, the frequency of drinking, the frequency of lying down, urination, and defecation. The feed given is forage in the area of oil palm plantation, with native vegetation are *Oplosnemus sp., Panicum trigonum, Asystasia gangetica*, etc. Livestock kept in the middle of oil palm plantation in individual per pan with floor space 2mx3m. The environmental parameters included light intensity, temperature, and humidity were observed at 06:00, 12:00, 18:00 and 24.00 for 12 consecutive days. The data collected was analyzed using one way analysis of variances.

RESULTS AND DISCUSSION

Oil palm plantations environment

Livestock productivity was influenced by two important factors, internal and external factors. Internal factors include genetics and body conditions while external factors were the environmental conditions in which their life. The suitability of environmental conditions and cows would produce a comfort zone for livestock to support maximum productivity. The easiest

environmental conditions to see and impact directly on livestock where temperature and humidity. Observations of the environmental conditions of oil palm plantations (temperature, humidity, and light intensity) were shown in Table 1.

Table 1. Temperature, humidity, and light intensity

Time	Temperaure (°C)	Humidity (%)	Light intensity (Lux)
06:00	25,7	90,5	4585,5
09:00	31,0	69,4	9908,5
12:00	38,4	46,4	14463,9
15:00	36,9	50,0	3702,5
18:00	33,1	67,6	1150,3
21:00	26,0	75,9	174,7
24:00	25,1	86,0	0,1
03:00	25,0	94,5	2,0
Mean±SD	30,15±5,15	72,54±16,67	4248,44±4988,46

From the observation, it could be seen that the daily light intensity was ranging from 0.1 to 14.463.9 lux, the temperature were ranging from 25.1 to 38.4 ° C, and the humidity were ranging 46.4 to 90,5%. According to Fraser (1980), the suitable environmental temperature to maintain the body condition of tropical cattle was 22 oC - 37oC. Some evidence suggests that tropical cows could keep for normal activity at 37oC. Combs (1996) cit. Sefrianingtyas (2013) stated that humidity 50% - 80% was the ideal moisture for the growth and development of beef cattle in Indonesia. Above that figure, populations of fungi and parasites that potentially became a source of disease tended to increase. Things that happen when moisture was too low would increase the concentration of dust that could increase respiratory distress. The environmental conditions of the oil palm plantations are still within the limits of the Bali cow's suitability to grow well.

Behavior of Bali cows at different reproduction phase

Balinese female has an environmental sensitivity compared to males or fattening, related to physiological cattle and hormonal body that occur. The results of observation of the behavior of Bali cows of various reproductive phases were shown in Table 2.

Table 2. Behavior of Bali Cows at different reproduction phase

Parameter	Dry	Pregnant	Lactating
Feeding time (h)	7,89[a]	8,06[a]	8,06[a]
Lying down (h)	9,90[a]	10,26[a]	10,36[a]
Standing (h)	13,64[a]	13,74[a]	14,10[a]
Rumination (h)	6,68[a]	6,73[a]	7,18[a]
Frequency of Feeding (times)	10,14[a]	10,46[a]	10,82[a]
Frequency of Drinking (times)	4,04[a]	4,14[a]	6,29[b]
Frequency of lying (times)	8,39[a]	8,54[a]	9,96[b]
Urination (times)	5,39[a]	6,00[a]	8,54[b]
Defecation (times)	5,25[a]	5,50[a]	6,54[b]

a,b different superscript in the same column shows a significant difference (P <0.05)

The behavior of Bali cows in the dry, pregnant, and lactating phases did not indicate a significant distinction at feeding times, sitting, standing, rumination, and eating frequency. Significant differences ($P < 0.05$) occurred in drinking, sitting, urinating, and defecation behavior. The behavior of Bali cows at all reproduction phase was in the normal range. Broom and Fraser (2015) stated that cows ate grass for 6.9 - 7.9 hours a day. Heifer of Hanwoo cattle (Bos taurus coreanae) with one individual per pan eating 31 meals/day and time spent eating 126 min/day (Shin et al., 2017). Dairy cows in the mixed group had to lye time 424 min/day and heifers were 461 min/day (Konggaard and Krohn, 1978 cit Grant and Al-bright, 2000 cit Grant and Al-bright, 2001). During pregnancy, cattle may exhibit abnormal disorders, especially when they experience sudden social and environmental changes (Grant and Al-bright, 1995 cit Shin et al., 2017).

No significant difference in the behavior of Bali cattle in different reproductive phases maintained in oil palm plantation areas showed that environmental conditions were still within the limits of livestock's ability to live. Excellent adaptability was a key factor in not real differences in behavior. Chamdi, 2005 cited. Rachma et. al., (2011) stated that Bali cattle that spread in some areas of Indonesia indicate that they had the very good ability to adapt to the environment. Bali cattle in Indonesia were mostly maintained with three kinds of maintenance systems, including grazing on open grasslands, grazing in plantation areas, and stacked. The three kinds of maintenance systems did not always provide with good quality, quantity feeding. (Rachma et al., 2011).

CONCLUSIONS

It was concluded that the environment of oil palm plantations in Rokhan Hulu district, Riau Province, Indonesia was suitable for all phase of the Bali cows live.

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